Utah Department of Health and University of Utah College of Pharmacy

UTAH MEDICAID DRUG REGIMEN REVIEW CENTER

ANNUAL REPORT:

OCTOBER 2016 - SEPTEMBER 2017

The Utah Medicaid Drug Regimen Review Center
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COLLEGE OF PHARMACY
UNIVERSITY OF UTAH
L. S. SKAGGS PHARMACY INSTITUTE

and

Utah Medicaid

DRUG REGIMEN REVIEW CENTER ANNUAL REPORT

October 1, 2016 – September 30, 2017

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INTRODUCTION

The College of Pharmacy at the University of Utah began operating its Drug Regimen Review Center (DRRC) in May 2002 to fulfill the terms of a contract with the Utah State Department of Health (DOH). The contract supports the Utah Medicaid prescription drug program and its drug utilization review process. The emphasis of the program is to improve the safety and efficacy of drug use in Medicaid patients, reduce the number of prescriptions and drug costs for frequent utilizers of the Medicaid drug program, and to support and educate the medical professionals who prescribe to Medicaid recipients.

Each month, a group of patients is selected (using an array of methods described herein) and a team of clinically trained pharmacists reviews each. These reviews result in recommendations made to prescribers, which are also described later in this report. Recommendations are sent, primarily via fax, to all prescribers of medications related to the identified drug therapy problems. Faxed materials also include a list of drugs dispensed during the month of review. The DRRC also provides information and consultation by telephone with prescribers and pharmacists when appropriate.

Mission

The three primary missions of the DRRC are:

1. Conduct retrospective, patient-level drug utilization review of the drug therapy of Utah Medicaid patients who meet criteria for high risk or utilization
2. Support the Medicaid DUR board's requirement to conduct retrospective and prospective drug utilization review by providing reports of patient-level utilization and evidence-based recommendations for minimizing risks of future drug therapy-problems
3. Support the Utah Medicaid P&T committee by providing systematic reviews of the evidence for comparative safety and efficacy for medications under consideration for inclusion on Medicaid's preferred drug list (PDL)

Staff

The DRRC utilizes a staff of professionals to run the program:

Clinical Pharmacists:

- Vicki Frydrych, BS, PharmD
- Valerie Gonzales, PharmD
- Joanita Lake, BPharm, MSc EBHC (Oxon)

Medical Writing:

- Elena Martinez, BPharm, MSc MTSI

Evidence retrieval:

- Michelle Fiander, MA, MLIS

Program Director:

- Joanne LaFleur, PharmD, MSPH

Data Management:

- Jacob Crook, MStat

Administration:

- Kristin Knippenberg, MFA
- Jennifer Larson

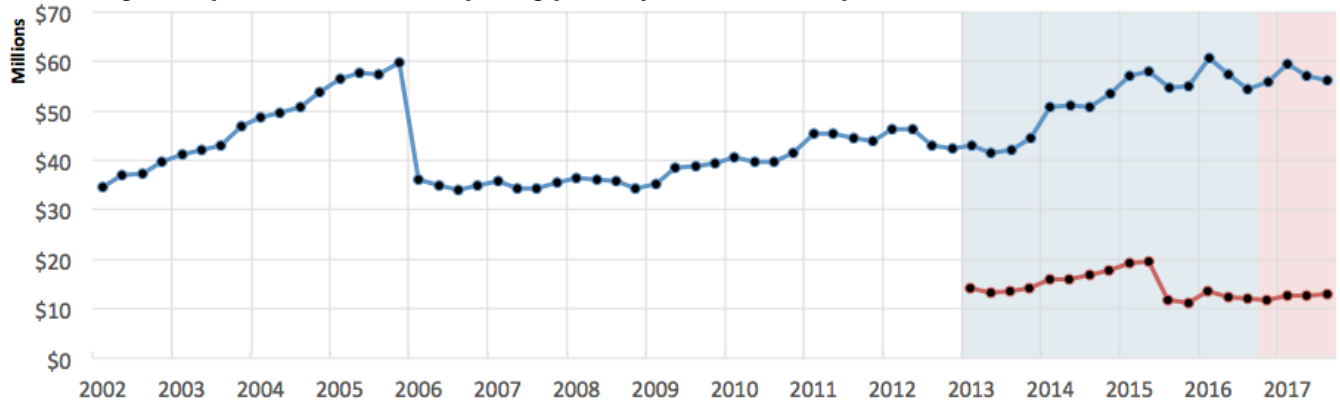
Program Rationale

The program's rationale hinges on historical changes in pharmacy expenditures.

Pre-Part D era

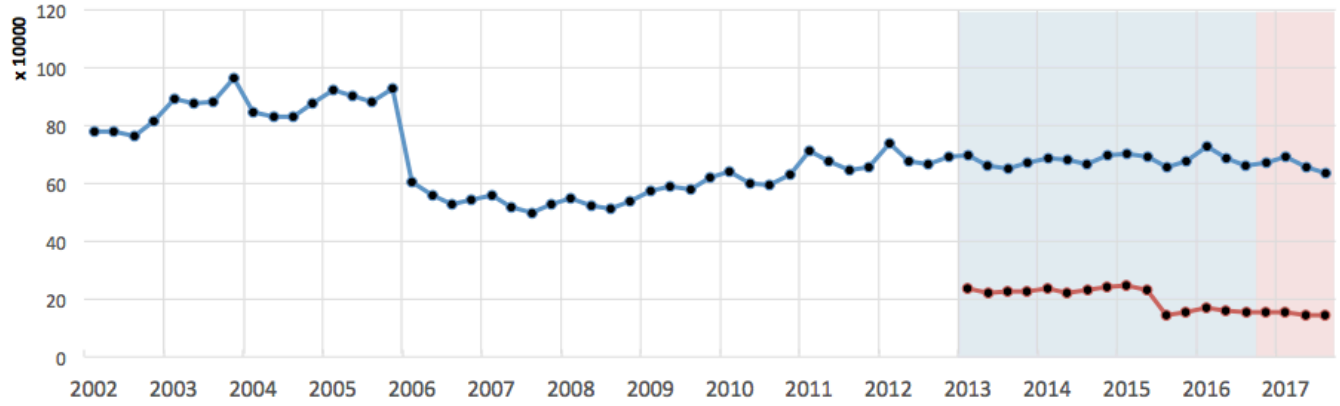
For the Utah Medicaid drug program, total pharmaceutical expenditures have been trending upwards since 2002 when we first began to examine them [1]. Total monthly Medicaid pharmacy expenditures were $11.7 million per month in January 2002. By December 2005, just prior to the implementation of Medicare Part D for elderly Medicare recipients, expenditures had increased to more than $20.7 million per month: a 75.8% increase over 4 years. These trends are summarized in Figures 1-6.

Figure 1. Quarterly Medicaid pharmacy expenditures overall, from January 2002 through September 2017 (blue line), and the FFS subset, from January 2013 through September 2017 (red line). Shaded areas correspond to the post-ACO era. Red shading corresponds to the current reporting period of October 2016-September 2017.



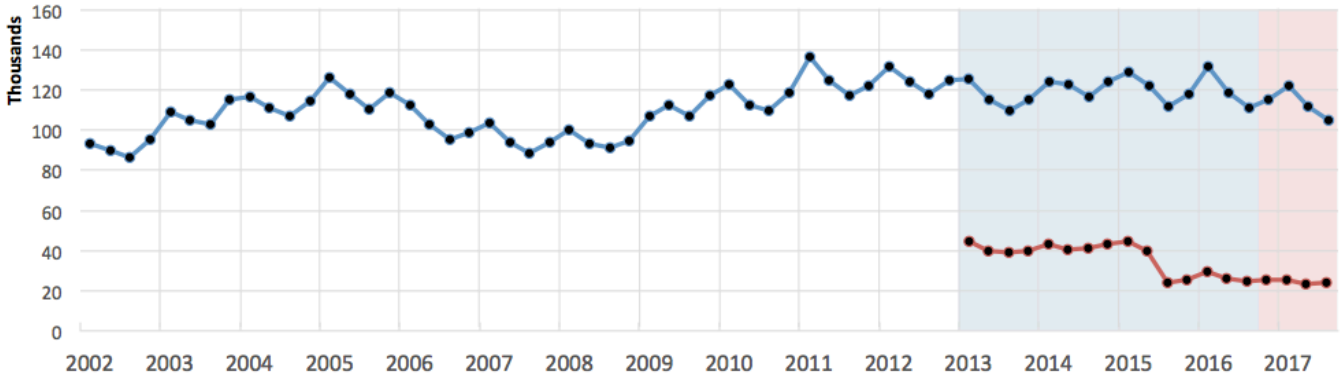
Key: FFS – fee-for service; ACO – accountable care organization

Figure 2. Quarterly number of Medicaid pharmacy claims overall, from January 2002 through September 2017 (blue line), and the FFS subset, from January 2013 through September 2017 (red line). Shaded areas correspond to the post-ACO era. Red shading corresponds to the current reporting period of October 2016-September 2017.



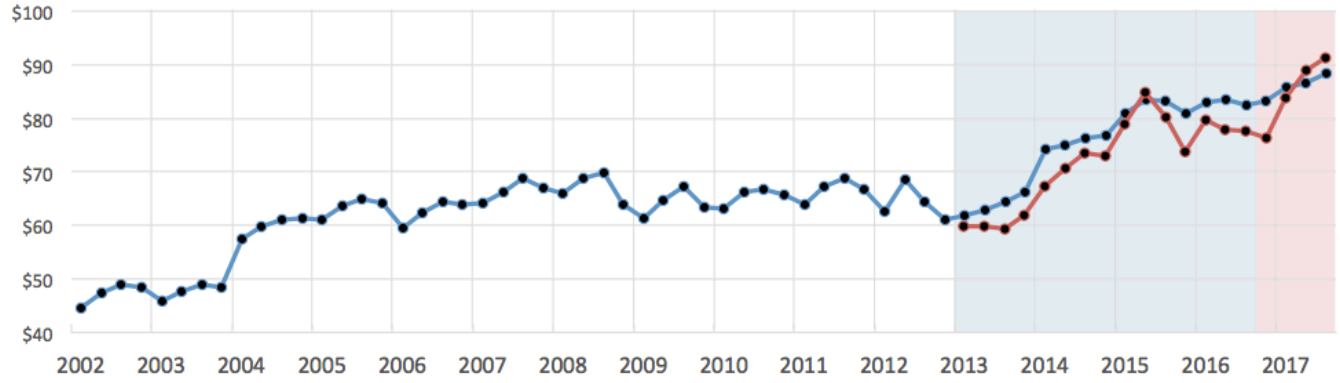
Key: FFS – fee-for-service; ACO – accountable care organization

Figure 3. Quarterly number of Medicaid recipients filling pharmacy claims overall (blue line), from January 2002 through September 2017, and the FFS subset (red line), from January 2013 through September 2017. Shaded areas correspond to the post-ACO era. Red shading corresponds to the current reporting period of October 2016-September 2017.



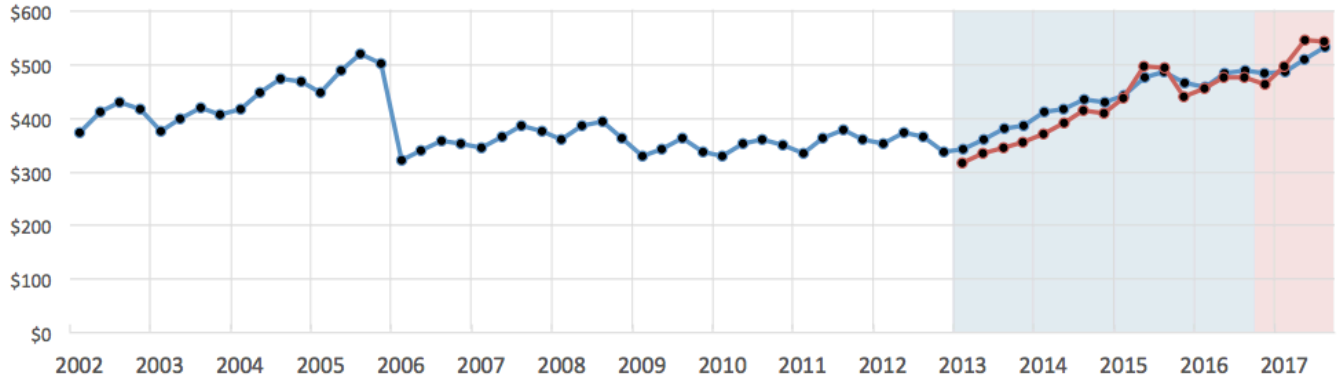
Key: FFS – fee-for-service; ACO – accountable care organization

Figure 4. Quarterly average expenditure per Medicaid pharmacy claim overall, from January 2002 through September 2017 (blue line), and the FFS subset, from January 2013 through September 2017 (red line). Shaded areas correspond to the post-ACO era. Red shading corresponds to the current reporting period of October 2016-September 2017.



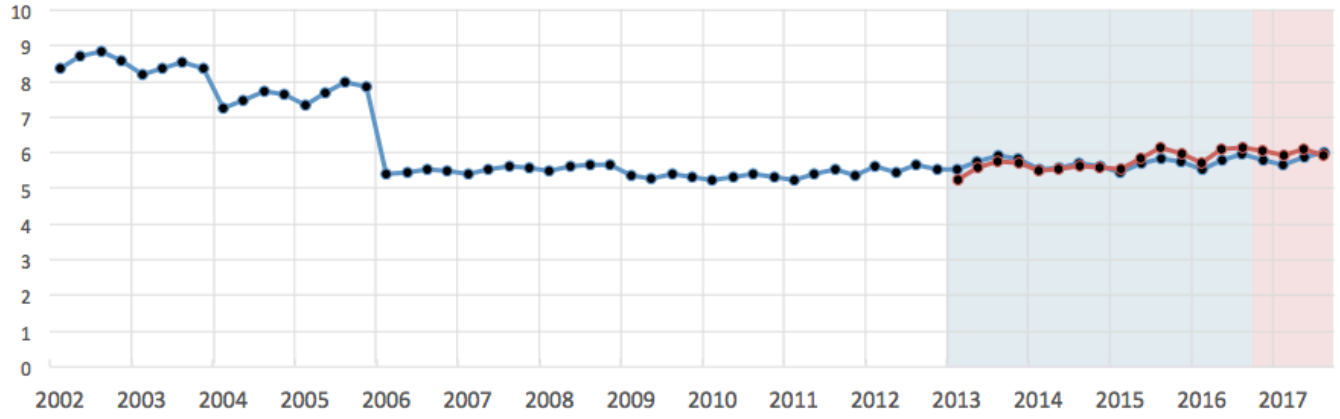
Key: FFS – fee-for-service; ACO – accountable care organization

Figure 5. Quarterly average expenditure per Medicaid recipient receiving pharmacy claims overall, from January 2002 through September 2017 (blue line), and the FFS subset, from January 2013 through September 2017 (red line). Shaded areas correspond to the post-ACO era. Red shading corresponds to the current reporting period of October 2016-September 2017.



Key: FFS – fee-for-service; ACO – accountable care organization

Figure 6. Quarterly average number of claims per Medicaid recipient receiving pharmacy claims overall, from January 2002 through September 2017 (blue line), and the FFS subset, from January 2013 through September 2017 (red line). Shaded areas correspond to the post-ACO era. Red shading corresponds to the current reporting period of October 2016-September 2017.



Key: FFS – fee-for-service; ACO – accountable care organization

The increases in that period can be explained by a combination of factors including increases in utilization (i.e., numbers of claims), and perhaps more importantly, increases in the average expenditure per pharmacy claim. During the same pre-Part D period described above, the total numbers of claims increased from 268 to 326 thousand claims per month, a 21.7% increase. At the same time, the average per-claim expenditure increased from $43.8 to $63.9, an increase of 44.5%. Increasing drug prices were explaining the largest portion of the increase in those years.

Post-Part D

After the implementation of Medicare Part D, when Medicaid/Medicare dually eligible patients switched to their Part D benefits, total pharmacy expenditures sharply declined. In a single month from December 2005 to January 2006 there was a 39.7% decline in expenditures, from $20.9 million in one month to $12.4 million in the next. That decline was explained almost exclusively by decreases in utilization. The number of claims from December to January that year went from 326 to 213 thousand, a 34.7% decrease. The average cost per prescription between those two months temporarily declined also, but only by 7.7%, from $63.3 to $58.5 per claim, perhaps as some of the more expensive elderly patients moved to Medicare. However, the average cost per claim was back up to pre-Part D levels within 6 months. On the other hand, utilization (in terms of claims per month) has never returned to pre-Part D levels.

In the years that followed the implementation of Medicare Part D, Utah Medicaid Pharmacy expenditures have continued to climb, surpassing pre-Part D levels for total expenditures and peaking at $21.7 million per month by March 2016, a 74.7% increase. Again, the increases in that period were explained by a combination of a relatively modest increase in number of claims (a 19.0% increase, from 203 to 253 thousand claims per month) combined with a relatively dramatic increase in average expenditure per claim (a 46.7% increase, from $58.5 to $85.8 per claim).

Accountable Care Organizations (ACOs)

Similar trends have been observed since the Affordable Care Act (ACA) provision for Accountable Care Organizations (ACOs) began in January 2013. In that month, Utah Medicaid patients in Weber, Davis, Salt Lake, and Utah counties were required to enroll in one of 4 ACO's in the state of Utah (i.e., Healthy Choice, Healthy U, Molina, and SelectHealth [2]. Nonetheless, total drug expenditures continued to climb.

In January 2013, In the first month of ACO implementation, 33.9% of the 253.4 thousand pharmacy claims paid by Medicaid were for FFS patients, which accounted for 32.2% of the costs. Between January 2013 through June 2015 FFS patients accounted for an average of 34.2% of the total claims and 32.6% of the total costs in every month. In that period, average expenditures per claim among FFS patients were 4.7% lower than the average expenditure per claim overall in those months.

In July 2015, Medicaid members in 9 additional counties were required to enroll in an ACO, including Box Elder, Cache, Iron, Morgan, Rich, Summit, Tooele, Wasatch, and Washington counties [3]. That month, the total number of Medicaid pharmacy expenditures and claims accounted for by FFS patients declined again as many more rural patients enrolled in ACOs. The pharmacy expenditures among FFS patients went from $6.7 million in June to $4.0 million in July 2015, a 40.0% decrease. The number of claims went from 75.4 thousand to 48.9 thousand, a 35.2% decrease.

Since the last change in ACO enrollment requirements, total expenditures have remained relatively stable at about an average of $18.9 million per month overall and $4.1 million per month in the FFS subset. (FFS expenditures have averaged about 21.7% of the total expenditures in each month.) Similarly, utilization has also remained relatively constant at an average of 225 thousand claims per month overall and 51 thousand claims per month in the FFS subset. (FFS utilization has averaged about 22.7% of the total number of claims per month.) The average expenditure per claim has remained relatively stable at about $84.0 per claim overall and $81.0 per claim in the FFS subset. On average, the mean expenditure per claim has been about 3.9% lower in the FFS subset versus overall in this period.

Current Reporting Period

Most recently, during the current reporting period from the end of the prior fiscal year (September 2016) to the current one (September 2017), the total number of claims decreased among all Medicaid patients from 222.1 to 212.8 thousand per month (a 4.2% decrease). Among the FFS subset, this change was 51.3 to 48.9 thousand per month (a 4.7% decrease). Drug expenditures among all patients also decreased very slightly during this same period, going from $18.1 million to $17.8 million per month (a 1.6% decrease). But among the FFS subset, drug expenditures increased from $3.9 million to $4.1 million per month (a 5.6% increase). This unusual increase is attributable to a 10.7% increase in the average expenditure per claim during that period, from $76.0 to $84.2 per claim. Despite ending the year with a higher average expenditure per claim among the FFS subset, the average monthly mean expenditure per claim among that subset was, on average, 3.9% lower compared to overall. These observations are summarized in Figures 7-14.

Goals of the Drug Regimen Review Center (DRRC)

Consistent with the goal of keeping Utah Medicaid drugs affordable is a need for ongoing review of the quality and safety of prescribing by Medicaid providers. The DRRC has produced numerous evidence-based recommendations for the Medicaid Pharmacy & Therapeutics (P&T) committee and criteria sets for the Drug Utilization Review (DUR) board. Pharmacist reviews of pharmacotherapy for Medicaid patients have also been associated with improved quality of drug therapy as well as improved clinical and economic endpoints.

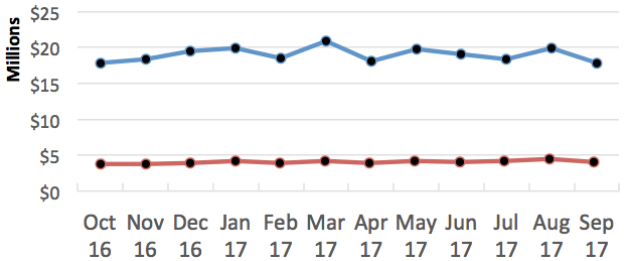
Summary of Services

The DRRC services the Medicaid Drug Utilization Review (DUR) Board, the Pharmacy and Therapeutics (P&T) Committee and Medicaid providers.

- The DRRC reviews the drug therapy of Medicaid patients and works with individual Medicaid prescribers to provide the safest and highest quality pharmacotherapy at the lowest cost possible. Since 2002, the DRRC has conducted approximately 150 patient reviews per month based on evolving criteria.
- The DRRC submits monthly reports and presentations to the Drug Utilization Review (DUR) Board. These reports focus on the role of selected agents among other treatments and on the utilization of these agents in the Utah Medicaid population to ensure appropriate and medically necessary use while considering potential safety, abuse and misuse issues. The DRRC has been providing this service since 2012.

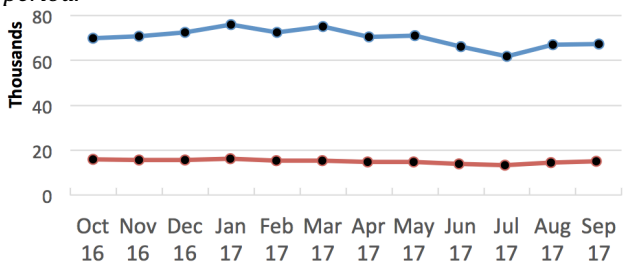
The DRRC also submits reports to the Pharmacy and Therapeutics (P&T) Committee consisting of a systematic review of the evidence for safety and efficacy of drug classes, utilization data, and available agents and dosage forms. The DRRC has been providing this service since 2010.

Figure 7. Overall (blue) and FFS (red) monthly pharmacy expenditures in the reporting period.



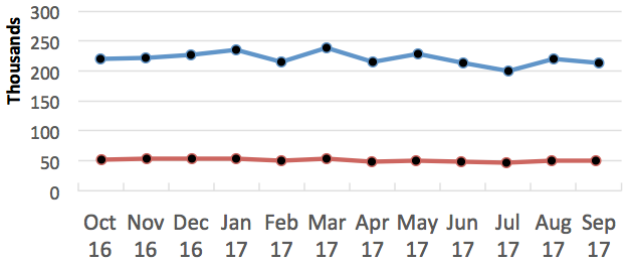
Key: FFS – fee-for-service

Figure 8. Overall (blue) and FFS (red) monthly number of patients with pharmacy claims in the reporting period.



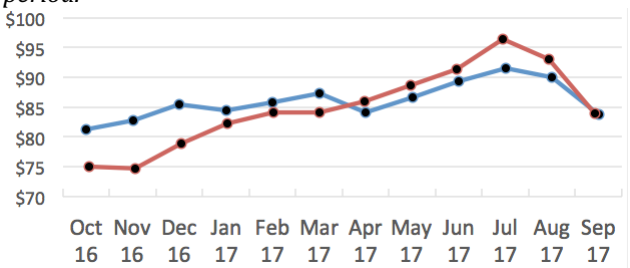
Key: FFS – fee-for-service

Figure 9. Overall (blue) and FFS (red) monthly number of pharmacy claims in the reporting period.



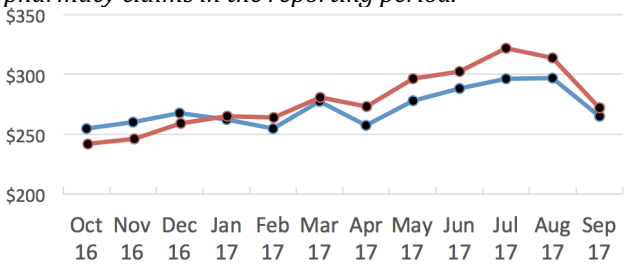
Key: FFS – fee-for-service

Figure 10. Overall (blue) and FFS (red) average pharmacy expenditure per claim in the reporting period.



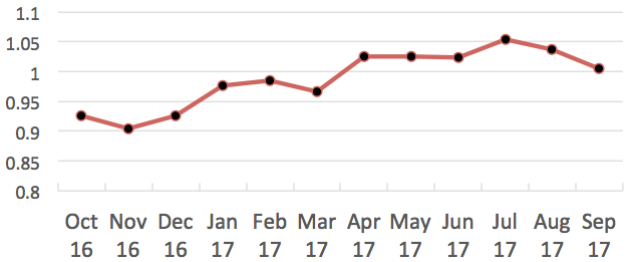
Key: FFS – fee-for-service

Figure 11. Overall (blue) and FFS (red) monthly pharmacy expenditures per patient among those with pharmacy claims in the reporting period.



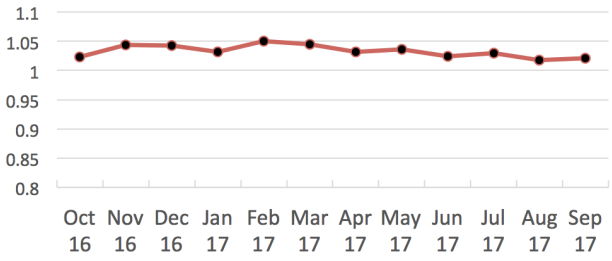
Key: FFS – fee-for-service

Figure 12. Average expenditure per FFS pharmacy claim as a proportion of average expenditure per pharmacy claim overall.



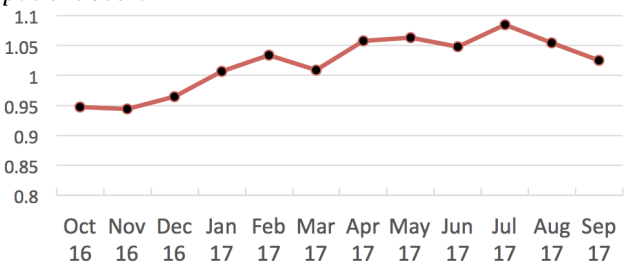
Key: FFS – fee-for-service

Figure 13. Average number of claims per FFS patient as a proportion of average number of claims per patient overall.



Key: FFS – fee-for-service

Figure 14. Average pharmacy expenditure per FFS patient as a proportion of average expenditure per patient overall.



Key: FFS – fee-for-service

SECTION 1: PATIENT REVIEWS

Past Patient Review Methodologies

From the program's inception in 2002 through October 2008, the selection criteria for patient review was relatively simple and straightforward: Patients who exceeded seven prescriptions per month were ranked by the number of prescriptions they received in that month, and the top 300 were selected after excluding children and patients who had been reviewed in the previous 12 months.

In 2008 the method of patient selection was modified significantly. The number of patients selected for review each month was reduced from 300 to 150, and three distinct rules for selection were implemented. Each of these new rules was used to select an average of 50 patients per month:

1. Prescription drug counts: An average of 50 patients per month were selected on the basis of the number of prescriptions per month. This was the same mechanism that had been used in the past. In each month, patients who received any prescription were ranked according to the number of prescriptions they received in that month, and those with the highest number of prescriptions who had not been reviewed in the previous 12 months were selected.
2. RxRisk comorbidity scores: An average of 50 patients per month were selected on the basis of RxRisk comorbidity scores. RxRisk is an instrument used for risk adjustment based on degree of comorbidity [4]. It was based on prescriptions filled by patients in the entire one-year period prior to the month of the review. The RxRisk comorbidity scale has been validated to identify patients at risk of having high medical expenditures in the subsequent year.
3. RxRisk chronic diseases: An average 50 patients per month were selected on the basis of the sum of chronic diseases they had, according to the RxRisk comorbidity scale. Patients were ranked according to the number of comorbid conditions they had, and those with the highest count who had not been reviewed in the previous 12 months were selected.

In 2011 the method of patient selection was modified again. The RxRisk chronic diseases rule, number 3 above, was eliminated and replaced with a single "variable rule" or combination of variable rules, created by the team of pharmacists. These rules were designed to target and address specific and prevalent problems that had observed in the general FFS Medicaid population. The approximately 50 patients who were selected using the targeted intervention criteria each month underwent a six-month re-evaluation to determine if the targeted drug therapy problems were still prevalent.

In January 2013 and then again in July 2015, a statewide policy decision modified the population eligible for selection by the DRRC using the 3 selection criteria described above (i.e., a high number of prescriptions, a high comorbidity score, and a monthly variable clinical rule). Under a Utah State Department of Health (DOH) policy, effective January 1, 2013, all Medicaid patients living in the state's four urban counties (i.e., Salt Lake, Utah, Davis and Weber) were required to enroll in one of four private-sector accountable Care Organizations (ACOs) and patients living in 25 rural counties were eligible to voluntarily enroll. Most pharmacy claims among ACO patients were processed and paid through those organizations. Given that each of the ACOs conduct their own drug utilization review programs, patient reviews completed by the DRRC program were limited to the remaining, traditional, FFS Medicaid patients, including those not enrolled in an ACO and living primarily in the state's 25 rural counties. In July 2015, the requirement to enroll in ACOs was extended to an additional 9 counties.

From initiation of the program in 2002 through September 2017, using all methods of patient selection since the program's inception, the DRRC has reviewed 26,561 patients. Of these patients, 14,045 unique patients (52.9%) had a concern for which the pharmacist chose to contact the prescriber. A total of 63,951 reports have been submitted to more than 6,800 prescribers via fax, phone, mail, or email from 2002 through the current reporting period. Most Medicaid prescribers have received multiple reports from the DRRC over the years. More than half of all patients reviewed have had reports sent to prescribers on their behalf, multiple times.

Feedback to and from prescribers is another critical component of the patient review process. When the DRRC began operating in May 2002, administrative efforts were focused primarily on soliciting logistical feedback from the prescribers we contacted. Information was collected regarding incorrectly identified patients and drugs, prescriber changes of practice, pharmacy input errors, incorrect addresses on file and patients not being treated by the prescriber identified. Using this feedback, the DRRC implemented a variety of verification procedures, made necessary adjustments to patient selection and prescriber identification processes, and began compiling a propriety database of personally verified information on doctors who prescribe drugs to Utah Medicaid patients. This propriety database now contains accurate contact, practice, background and prescribing information for several thousand Utah prescribers. By the end of 2009, these administrative efforts had reduced the incidence of these types of logistical issues to practically none and the program began to focus on quality feedback.

Present Patient Review Methodology and Selection Criteria

In order to target commonly recurring drug therapy issues seen in the general Medicaid population, we presently select approximately 150 FFS patients for review each month based on three methods: (1) greatest number of prescription drug fills, (2) RxRisk comorbidity scores, and (3) a series of variable rules that were changed from month to month, if appropriate. Patients selected on the basis of the variable rule undergo a targeted intervention, with re-evaluation after 6 months. Table 1 summarizes the variable rules that were used in each month during the current reporting period.

When reviewing a patient selected by any method, the DRRC pharmacists may notice a pattern of prescription fills that suggests drug-therapy problems (DTPs) or inappropriate utilization of health care services on the part of that patient [5-7]. Table 2 defines the different DTPs included in reports that have been sent to prescribers since the inception of the program. The most common warning signs of inappropriate utilization are utilization of multiple physicians, pharmacies, emergency rooms or controlled substances in patterns that indicate likely abuse, uncoordinated care, or a lack of primary care. Patients displaying these patterns are flagged by DRRC pharmacists for potential referral to, and possible enrollment in, the Medicaid Restriction Program. The Medicaid Restriction Program provides safeguards against inappropriate and excessive use of Medicaid services. The program provides a mechanism by which pharmacists, prescribers, and other health care providers can report suspicious behavior to Medicaid.

Efforts towards developing the DRRC's proprietary prescriber database have yielded better quality feedback from prescribers. Beginning in October 2009, every recommendation sent to a prescriber in a patient report has included a section asking that prescriber to provide his or her opinion about the general usefulness of the recommendation and the likelihood of implementation into the patient's existing drug regimen, each on a scale of 1-5. Figure 15 shows an example of the feedback solicitation included with every DRRC recommendation.

All feedback and prescriber comments are compiled into a monthly report for the DRRC pharmacists to review at monthly Quality Assurance (QA) meetings, where specific recommendations and general intervention protocols are reviewed and revised as needed.

We have compiled descriptive statistics regarding the effectiveness of the DRRC patient review program during October 2016 through September 2017, as well as qualitative descriptions of differences made in patient care for a few cases. Quantitative measures include changes in numbers of prescriptions, for patients selected on that criteria and for all patients; changes in RxRisk score, for patients selected on that criteria and for all patients; changes in patients needing targeted interventions 6 months after implementing intervention; changes in prevalence of DTPs; and changes in cost.

Table 1. Variable rule criteria used for targeted patient interventions between October 2016 and September 2017

Month	Definition	Purpose
Oct 16	ACE/ARB medication is defined as any drug with a generic name containing benazepril, captopril, cilazapril, enalapril, fosinopril, lisinopril, moexipril, perindopril, quinapril, ramipril, trandolapril, azilsartan, candesartan, eprosartan, irbesartan, losartan, olmesartan, telmisartan or valsartan, alone or in combination.	To identify patients who are nonadherent to their ACE/ARB medication and are, therefore, at high risk for reduced drug efficacy and poor health outcomes.
Nov 16	ACE/ARB medication is defined as any drug with a generic name containing benazepril, captopril, cilazapril, enalapril, fosinopril, lisinopril, moexipril, perindopril, quinapril, ramipril, trandolapril, azilsartan, candesartan, eprosartan, irbesartan, losartan, olmesartan, telmisartan or valsartan, alone or in combination.	To identify patients who are nonadherent to their ACE/ARB medication and are, therefore, at high risk for reduced drug efficacy and poor health outcomes.
Dec 16	Statin medication is defined as any drug with a generic name containing atorvastatin, fluvastatin, lovastatin, pitavastatin, pravastatin, rosuvastatin or simvastatin, alone or in combination.	To identify patients who are nonadherent to their statin medication and are, therefore, at high risk for reduced drug efficacy and poor health outcomes.
Jan 17	Statin medication is defined as any drug with a generic name containing atorvastatin, fluvastatin, lovastatin, pitavastatin, pravastatin, rosuvastatin or simvastatin, alone or in combination.	To identify patients who are nonadherent to their statin medication and are, therefore, at high risk for reduced drug efficacy and poor health outcomes.
Feb 17	Statin medication is defined as any drug with a generic name containing atorvastatin, fluvastatin, lovastatin, pitavastatin, pravastatin, rosuvastatin or simvastatin, alone or in combination.	To identify patients who are nonadherent to their statin medication and are, therefore, at high risk for reduced drug efficacy and poor health outcomes.
Mar 17	Benzodiazepine is defined as AHFS drug class 28:12.08 (Anticonvulsants) and AHFS 28:24:08 (Anxiolytics, Sedative Hypnotics). Opioid is defined as AHFS drug class 28:08.08 (Opiate Agonists) and AHFS drug class 28:08.12 (Opiate Partial Agonists), including all combination products.	To identify patients at risk of respiratory depression and death from a combination of opioid and benzodiazepine therapy. And to assess whether a recommendation should be made to prescribe naloxone for emergency reversal of opioid intoxication.
Apr 17a	Benzodiazepine is defined as AHFS drug class 28:12.08 (Anticonvulsants) and AHFS 28:24:08 (Anxiolytics, Sedative Hypnotics). Opioid is defined as AHFS drug class 28:08.08 (Opiate Agonists) and AHFS drug class 28:08.12 (Opiate Partial Agonists), including all combination products.	To identify patients at risk of respiratory depression and death from a combination of opioid and benzodiazepine therapy. And to assess whether a recommendation should be made to prescribe naloxone for emergency reversal of opioid intoxication.
Apr 17b	Medications indicated for insomnia include butabarbital , doxepin, estazolam, eszopiclone, flurazepam, pentobarbital, quazepam, ramelteon, secobarbital , suvorexant, temazepam, triazolam, trazodone, Zaleplon and Zolpidem.	To reduce therapeutic duplication of treatment of insomnia and reduce risk for additive central nervous system and respiratory system adverse events.
May 17	Metformin is defined as any single-product containing metformin in the generic name. Vitamin B12 evaluation is defined as ICD10 code E538 or E539 or D510 or D511 or D513 or D518 or D519 or D538 or D539 or T452X6*.	There is an association between B12 deficiency and long-term metformin usage. ADA guidelines recommend consideration of periodic measurement of B12 levels with supplementation as needed.
Jun 17a	Short-acting insulin is defined as insulin glulisine, insulin lispro, insulin aspart or human insulin. Basal insulin is defined as insulin degludec, insulin glargine or insulin detemir. NPH insulin is defined as Humalog 75/25, Humalog 50/50, Humulin 70/30, Novolin 70/30 or Novolog 70/30.	New 2017 ADA and other guidelines recommend that for most patients with diabetes, basal insulin therapy should be the first insulin therapy prescribed. For patients at low risk of hypoglycemia, NPH insulin may be considered a basal insulin.
Jun 17b	Non-abusable drug is defined as any generic agent containing quetiapine, promethazine, gabapentin, venlafaxine, bupropion or baclofen.	To identify patients who are potentially abusing a "non-abusable" drug.
Jul 17a	Statin medication is defined as any drug with a generic name containing atorvastatin, fluvastatin, lovastatin, pitavastatin, pravastatin, rosuvastatin or simvastatin, alone or in combination.	To identify patients who are nonadherent to their statin medication and are, therefore, at high risk for reduced drug efficacy and poor health outcomes.

Table 1. Variable rule criteria used for targeted patient interventions between October 2016 and September 2017

Month	Definition	Purpose
Jul 17b	ACE/ARB medication is defined as any drug with a generic name containing benazepril, captopril, cilazapril, enalapril, fosinopril, lisinopril, moexipril, perindopril, quinapril, ramipril, trandolapril, azilsartan, candesartan, eprosartan, irbesartan, losartan, olmesartan, telmisartan or valsartan, alone or in combination.	To identify patients who are nonadherent to their ACE/ARB medication and are, therefore, at high risk for reduced drug efficacy and poor health outcomes.
Aug 17	Stimulant defined as dexmethylphenidate, dextroamphetamine, dextroamphetamine-amphetamine mixed salts, lisdexamfetamine, or methamphetamine. Benzodiazepines defined as alprazolam, chlordiazepoxide, clonazepam, clorazepate, diazepam, estazolam, flurazepam, lorazepam, midazolam, oxazepam, quazepam, temazepam, or triazolam.	To identify patients who are receiving concurrent stimulant and benzodiazepine treatment.
Sep 17	Stimulant defined as dexmethylphenidate, dextroamphetamine, dextroamphetamine-amphetamine mixed salts, lisdexamfetamine, or methamphetamine. Benzodiazepines defined as alprazolam, chlordiazepoxide, clonazepam, clorazepate, diazepam, estazolam, flurazepam, lorazepam, midazolam, oxazepam, quazepam, temazepam, or triazolam.	To identify patients who are receiving concurrent stimulant and benzodiazepine treatment.

Key: ACE – angiotensin-converting enzyme; ARB – angiotensin receptor blocker; AHFS – American Hospital Formulary Service; ICD10 – 10th revision of the International Classification of Diseases; ADA – American Diabetes Association; NPH – isophane insulin

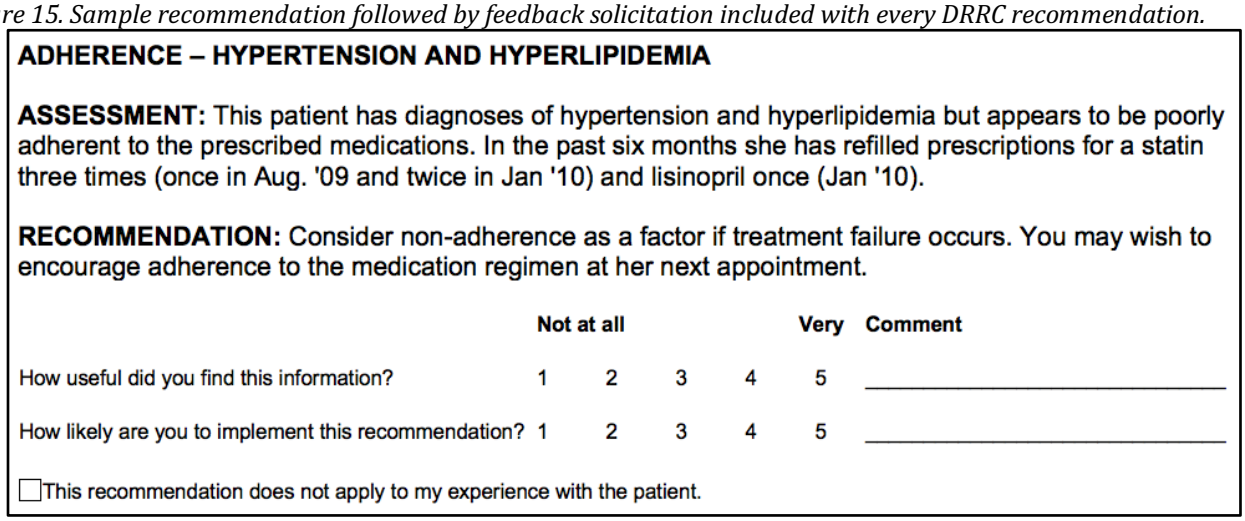
Table 2. Definitions of drug-therapy problems (DTPs)

DTP	Description
Additive toxicity	The concomitant use of medications with similar pharmacodynamic actions that may produce excessive pharmacologic or toxic effects when given together. To minimize additive toxicity, a patient's drug regimen may need to be adjusted to include a decreased number of medications that cause a given toxicity.
Adherence	A pattern of refills that indicates that a patient is not adherent to a prescribed regimen that is intended to be used on an ongoing basis to treat a chronic disease.
Brand name dispensed	The use of a brand-name medication when a less costly bioequivalent alternative is available.
Consider alternative	The use of a medication with no bioequivalent generic but with a less costly alternative agent in the same class. For some medications, different agents within the same class are therapeutically interchangeable and another drug can be selected without negatively impacting the patient's drug therapy.
Coordinate care	The prescribing of multiple medications for the same disease state by multiple providers. Uncoordinated care may result in insufficient monitoring of a patient's disease states and could lead to other drug-related problems such as drug-drug interactions, drug-disease interactions and therapeutic duplications.
Dose exceeds usual recommendation	The use of a medication above the recommended dosage range for a patient's age or condition.
Drug available over the counter	The receipt of a medication by prescription when it is available over-the-counter (OTC). Although many OTC medications are clinically useful and less costly alternatives to prescription drugs, we ask providers to use their judgment as to whether or not patients can purchase the item themselves.
Drug-disease interaction	The use of a medication that is contraindicated due to the patient's age, gender, or disease state(s).
Drug-drug interaction	Increased toxicity or decreased therapeutic activity of one or more medications due to the concomitant use of another drug that affects its activity. Drugs that induce or inhibit hepatic metabolism, drugs that are highly protein-bound or drugs that affect the renal clearance of another are frequently involved in drug-drug interactions.
Duration exceeds usual recommendation	The use of a medication for longer than recommended for the patient's age or condition. Excessive duration of therapy may lead to additional adverse effects and toxicity.
Medication over-utilization	The frequent use of a medication or class of medications that are intended for acute treatment and not at frequent intervals.
Streamline therapy	The use of more Tablets or capsules than necessary to achieve a desired dose or the receipt of separate dosage forms for two agents that are available in a combination product. Streamlining therapy could result in improved patient compliance and clinical outcomes.

Table 2. Definitions of drug-therapy problems (DTPs)

DTP	Description
Sub-therapeutic dose	The use of a medication below the recommended dosage range for the patient's age or condition. Sub-therapeutic dosing may cause patients to experience adverse effects without therapeutic benefit or may require the addition of other medications to control a disease state that could be controlled by the use of a single medication at an appropriate dosage level.
Therapeutic duplication	The inappropriate use of multiple medications for the same indication.
Treatment without an indication	The use of a medication without an apparent indication. Unnecessary exposure to medications may lead to increased risks of adverse events and toxicity.
Untreated indication	The absence of a medication that appears to be needed based on usual best practices or guidelines. Untreated indications could result in increased morbidity and mortality for a patient.

Figure 15. Sample recommendation followed by feedback solicitation included with every DRRC recommendation.



ADHERENCE – HYPERTENSION AND HYPERLIPIDEMIA

ASSESSMENT: This patient has diagnoses of hypertension and hyperlipidemia but appears to be poorly adherent to the prescribed medications. In the past six months she has refilled prescriptions for a statin three times (once in Aug. '09 and twice in Jan '10) and lisinopril once (Jan '10).

RECOMMENDATION: Consider non-adherence as a factor if treatment failure occurs. You may wish to encourage adherence to the medication regimen at her next appointment.

	Not at all				Very	Comment
How useful did you find this information?	1	2	3	4	5	_____
How likely are you to implement this recommendation?	1	2	3	4	5	_____

☐ This recommendation does not apply to my experience with the patient.

Key: DRRC – Drug Regimen Review Center

Although our program is not designed to target costs, costs may be impacted by the services we provide. Consequently, we tracked drug cost reimbursements for reviewed patients, stratified by selection method, for the remainder of the reporting period following the month they were reviewed. We track costs only for patients who remain eligible during the entire reporting period and who access their drug benefit at least once during each month in the reporting period. Reviewed patients from the FFS population are only tracked if they did not subsequently enroll in an ACO prior to September 2017. For each patient reviewed between October 2016 and September 2017, total drug cost during the review month is used as the baseline amount for comparison, and we assume stable drug costs with no increases. These baseline costs are compared with the drug costs for each subsequent month up until September 2017. For example, costs in May 2016 are compared with costs in June 2016, July 2016, August 2016 and September 2016 for those patients reviewed during May 2016. Savings for the same patients outside the current reporting period are not included in this report.

Results for Patient Reviews

Characteristics of Reviewed Patients

A total of 1,737 patients was reviewed during the current reporting period, corresponding to an average of 145 patients per month.[a] The number selected in each month, overall and by selection method, is summarized in

[a] *While we are contracted to review 150 patients per month, the average number of patients actually reviewed on a month-to-month basis varies depending on numbers of patients exceeding each threshold and/or meeting each variable rule and because the exact number of patients is a secondary consideration to the specific inclusion threshold. In the prior reporting year we exceeded the 150-minimum for the average number of patients per month. This fiscal year we fell below, but in the 2017 calendar year we reviewed an average of 155 patients per month. Overall we guarantee that we will review, at a minimum, the contracted number of 1,800 per patients per year across contract years.*

Figure 16. The monthly totals are less than the sum of the three selection methods in each month whenever there is a patient included under more than one of the selection methods.

Demographics and some utilization and clinical metrics for all review cohorts throughout the year are displayed in Table 3 and Figures 17 and 18. On average, reviewed patients were predominantly females in their mid-40s who filled about 8 prescriptions per month, although the percentages of reviewed patients that were female in each month ranged from 56% to 79%. Reviewed males were slightly younger than reviewed females. The mean ages ranged from 39.7 to 50.9 for females and only 32.6 to 50.3 for males. Expenditures per prescription claim also tended to be higher in females, ranging from $43.51 to $117.29 for females and $61.61 to $103.74 for males. Females also tended to have a higher number of prescriptions per month, ranging from 5.7 to 9.8; in males it ranged from 4.1 to 8.6. This may be attributable to differences in Medicaid eligibility rules for women in their childbearing years relative to men combined with sex differences in healthcare utilization that have been observed across populations [8]. The minimum number of prescriptions filled by patients in any month was 1 (for patients selected by rules other than the "exceeds the threshold for prescription claims" criterion); the maximum number of prescriptions filled by any patient in any month was 28, which occurred in April 2017.

Figure 16. Numbers of patients reviewed according to each selection method, October 2016 through September 2017.

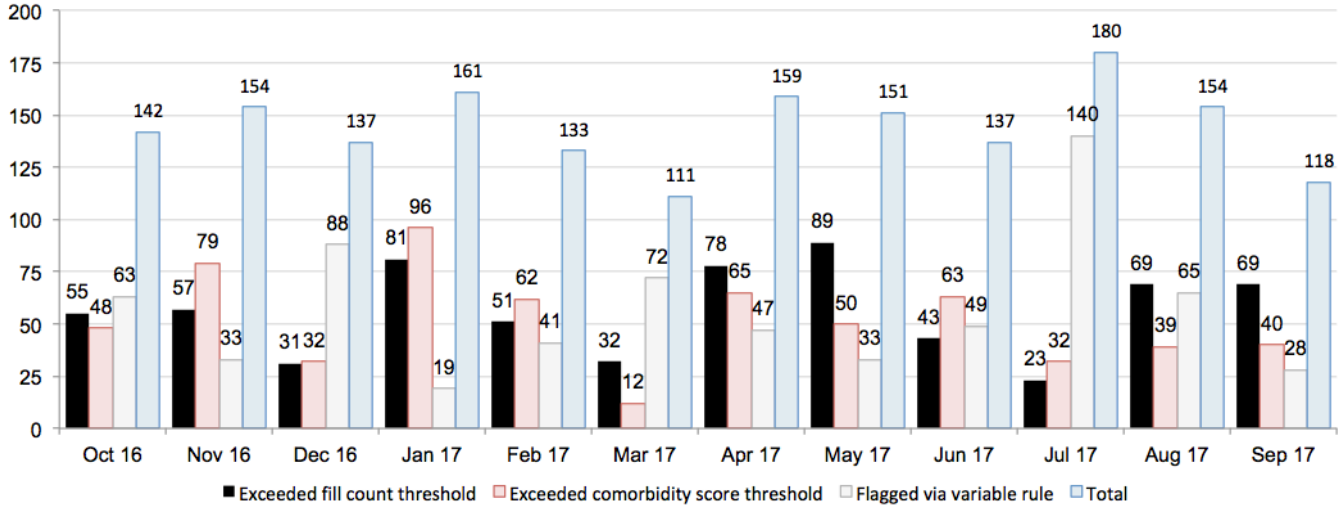


Table 3. Demographics of all reviewed patients

Month	Female				Male			
	Percentage of reviewed patients who were female	Mean age	Mean claim count	Mean expenditure per claim	Percentage of reviewed patients who were male	Mean age	Mean claim count	Mean expenditure per claim
Oct 16	60	45.6	7.7	$85.96	40	48.0	5.6	$75.62
Nov 16	65	43.7	9.1	$82.16	35	40.8	7.3	$100.15
Dec 16	62	51.3	7.2	$64.72	38	49.3	4.9	$86.72
Jan 17	63	44.9	9.8	$90.24	38	34.2	7.9	$101.74
Feb 17	69	45.0	8.6	$56.26	31	45.8	6.6	$57.07
Mar 17	72	46.8	6.2	$43.51	28	49.4	6.4	$72.59
Apr 17	68	43.7	8.6	$88.01	32	41.7	7.8	$61.61
May 17	68	44.3	9.2	$117.29	32	42.8	8.4	$103.07
Jun 17	76	39.7	8.2	$93.33	24	32.6	6.7	$88.93
Jul 17	56	50.9	5.7	$116.00	44	50.3	4.1	$86.86
Aug 17	64	44.3	7.5	$71.60	36	37.4	6.8	$69.43
Sep 17	79	40.6	9.2	$89.20	21	37.4	8.6	$85.59
Mean	67	45.1	8.1	$83.19	33	42.5	6.7	$82.45

Note: Assisted living facility patients and patients selected for review but subsequently not selected for intervention by the reviewing pharmacist are not included.

Figure 17. Median and range of number of prescription fills received by all reviewed patients in October 2016-September 2017.

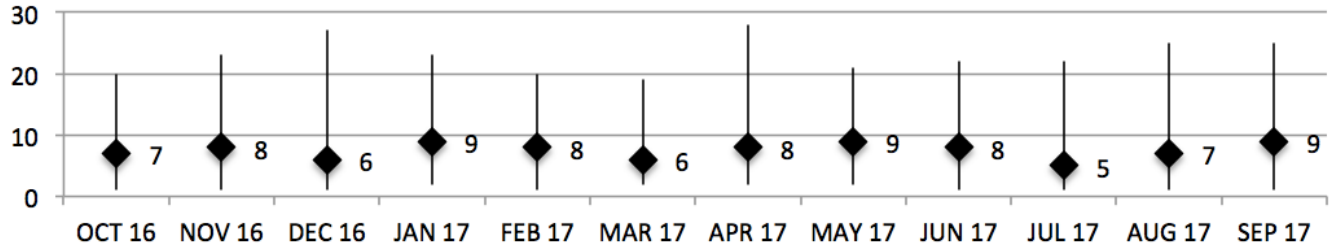
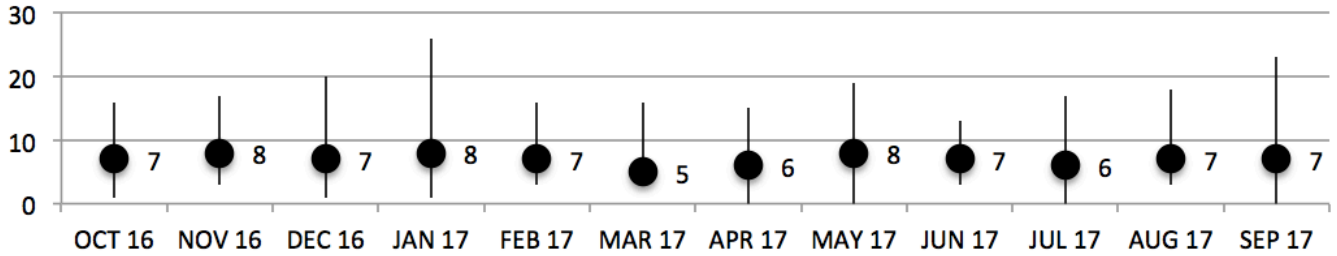


Figure 18. Median and range of the comorbidity index, October 2016 through September 2017.



Patients Selected for a High Number of Prescriptions Filled

A total of 678 patients (39.0%) were flagged for review during the year because they exceeded the threshold for the fill count established in the month of review; these thresholds are summarized in Table 4. Figure 17 summarizes the average and range of the number of prescriptions among all reviewed patients. While the minimum threshold for count used to select patients for review ranged from 10-14, when considering patients selected by any rule, the median number of prescriptions among all patients reviewed generally ranged from 7 to 9 and the maximum number of prescriptions for a reviewed patient was 28.

Table 4. Minimum fill counts and comorbidity scores among patients selected for review, October 2016 through September 2017

Month	Threshold for prescription fill count qualifying for review	Threshold for comorbidity score qualifying for review
Oct 16	11	10
Nov 16	12	9
Dec 16	13	10
Jan 17	11	9
Feb 17	11	9
Mar 17	13	12
Apr 17	11	9
May 17	10	9
Jun 17	13	9
Jul 17	14	10
Aug 17	11	10
Sep 17	11	10

Patients Selected for a High Comorbidity Score

A total of 618 patients (35.6%) were flagged for review during the year because they exceeded the threshold for the RxRisk comorbidity score established in the month of review; these thresholds are also summarized in Table 4. Figure 18 shows the median and range of the comorbidity scores among all reviewed patients. While the minimum threshold for the comorbidity score used to select patients for review ranged from 9-12, when considering patients selected by any rule, the median score was between 6 and 8, while the maximum score was 26.

Patients Selected for Targeted Interventions with Monthly Variable Rules

A total of 631 patients (36.3%) were flagged for review during the year because they met at least one of the variable rules used in the end of the prior year or early in the current year [9]. The patients selected each month using the variable rule/targeted intervention criteria undergo a 6-month re-evaluation to determine if the originally identified DTPs are still present.

Interventions and Drug Therapy Problems (DTPs)

Of the 1,737 patients selected for review using all selection methods during the current reporting period, 1,513 patients (87.1%) were deemed by the reviewing pharmacist to have DRPs significant enough to warrant an

intervention letter to the patient's prescriber or prescribers, as shown in Figure 19. A total of 3,790 DRPs were identified using all selection methods during the current reporting period, and a total of 2,177 letters were sent to prescribers reporting these problems: an average of 1.25 letters per patient.

A total of 3,790 DTPs were identified using all selection methods during the current reporting period, and a total of 2,177 letters were sent to prescribers reporting these problems. Table 5 details the proportion of patients with significant DRPs in each review cohort, overall and by selection method. A summary of the frequencies of specific DTPs identified by pharmacists between October 2016 and September 2017 is summarized in Figure 20. The most common drug therapy problem identified in the current reporting period was adherence, a pattern of refills indicating a patient is not adherent to a prescribed regimen that is intended to treat a chronic disease. The second most common DTP was the identification of an untreated condition, and recommendations to treat that condition.

Figure 19. Numbers of patients reviewed and who received interventions in each month

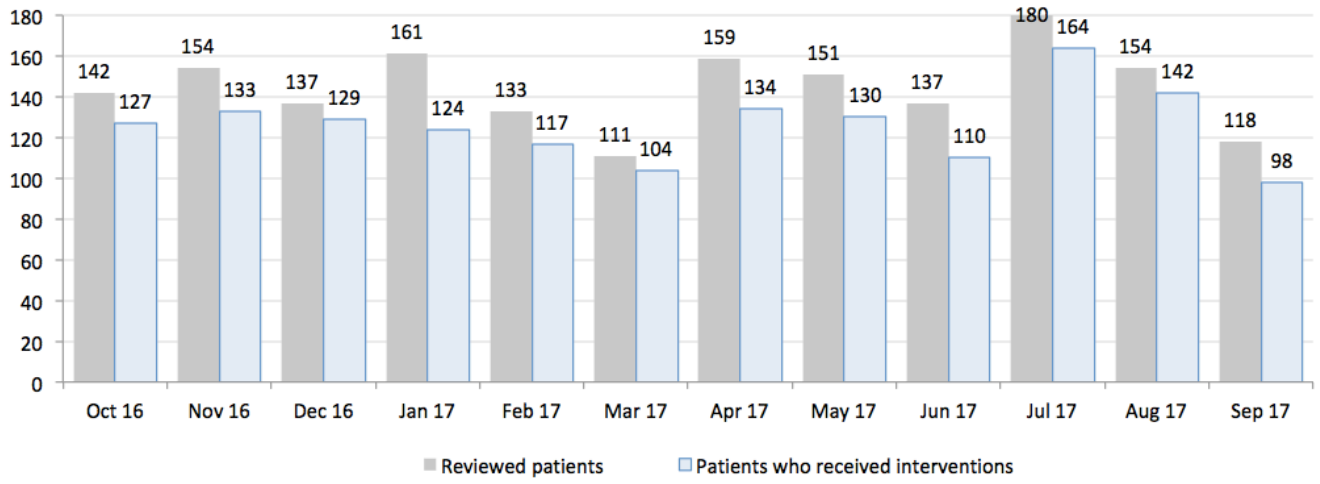
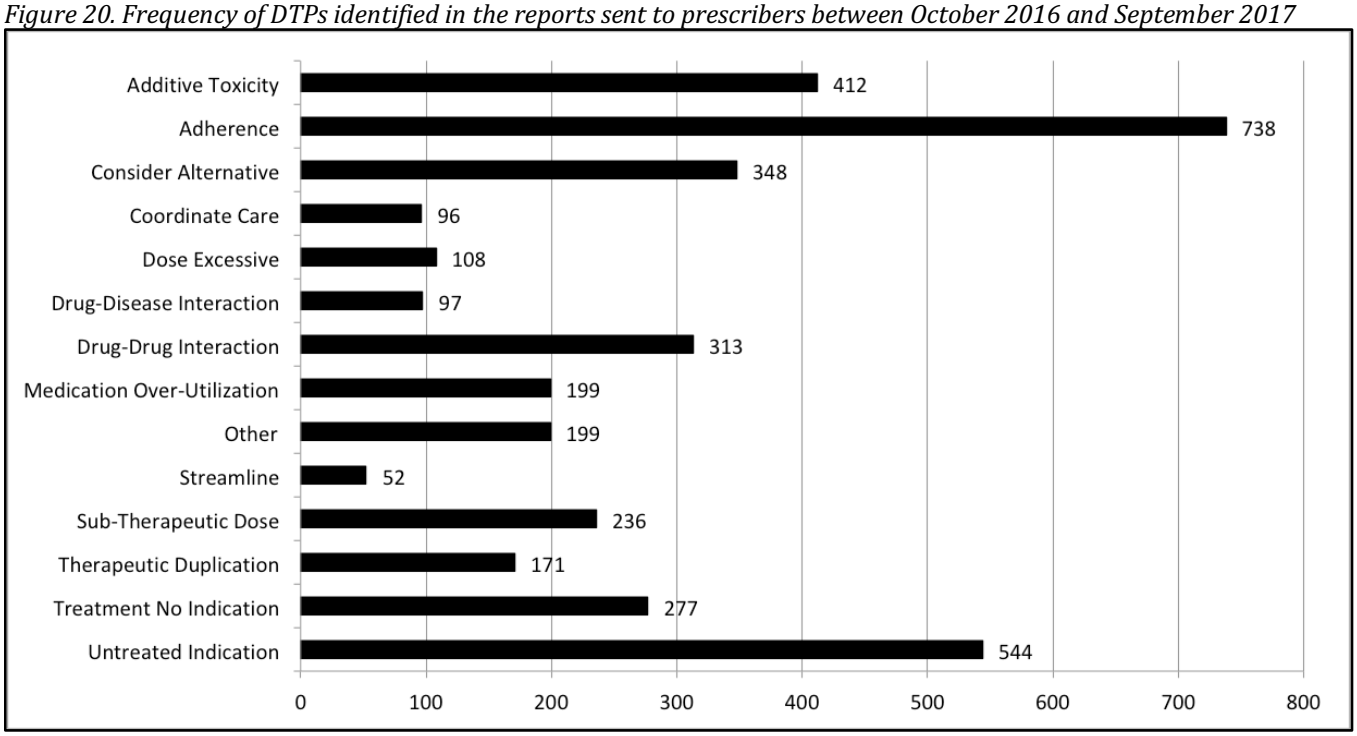


Table 5. Proportion of patients with significant DTPs in each review cohort, by selection method and overall, October 2016-September 2017

	Oct 16	Nov 16	Dec 16	Jan 17	Feb 17	Mar 17	Apr 17	May 17	Jun 17	Jul 17	Aug 17	Sep 17
Fill count												
Reviewed	55	57	31	81	51	32	78	89	43	23	69	69
DTPs	34	37	13	68	11	22	39	53	15	25	30	57
%	61.8%	64.9%	41.9%	84.0%	21.6%	68.8%	50.0%	59.6%	34.9%	108.7%	43.5%	82.6%
RxRisk score												
Reviewed	48	79	32	96	62	12	65	50	63	32	39	40
DTPs	34	62	11	72	11	9	30	31	19	31	23	32
%	70.8%	78.5%	34.4%	75.0%	17.7%	75.0%	46.2%	62.0%	30.2%	96.9%	59.0%	80.0%
Variable rule												
Reviewed	63	33	88	19	41	72	47	33	49	140	65	28
DTPs	55	26	40	17	8	76	28	19	19	129	28	25
%	87.3%	78.8%	45.5%	89.5%	19.5%	105.6%	59.6%	57.6%	38.8%	92.1%	43.1%	89.3%
Total												
Reviewed	142	154	137	161	133	111	159	151	137	180	154	118
DTPs	108	114	58	127	25	99	78	89	47	169	69	98
%	76.1%	74.0%	42.3%	78.9%	18.8%	89.2%	49.1%	58.9%	34.3%	93.9%	44.8%	83.1%

Figure 20. Frequency of DTPs identified in the reports sent to prescribers between October 2016 and September 2017



Results for Program Evaluation

Feedback from Providers

Logistical Feedback

Providers who have been sent an intervention letter may give feedback to the DRRC about one of the logistical issues (i.e., patient unknown, patient deceased, patient no longer with prescriber, prescriber misidentified, prescriber no longer practicing, not primary care, pharmacy input error).

Quality Feedback

The average ratings received since October 2009 of two feedback solicitations included with every DRRC recommendation are as follows:

- On the general usefulness of pharmacist recommendations, on a scale of 1-5: **4.2**.
- On the likelihood of implementation into the patient's existing drug regimen, on a scale of 1-5: **3.1**.

Below is a sample of the prescriber comments that have been received by the DRRC in the past:

"Useful as a reminder for patients not presenting often."

"Appreciate notes and education."

"Discussed with patient."

"I appreciate the reminder."

"I will discuss with patient and monitor closely."

"I appreciate the information."

"Good information for monitoring the patient."

"I believe patient is taking over-the-counter meds intermittently, but it is good to know they would be covered."

"I have encouraged this many times, will do again."

"I will discuss with mom and patient when they come to clinic."

"I will no longer prescribe controlled substances for her."

"Have followed recommendation."

"I'll try to remember this next time she has an infection. Thanks!"

"Thanks for the information!"

"Very useful. Very likely to implement this."

"Patient counseled to talk with other providers and discontinue benzos."

"Will decrease dosage gradually."

"Will start on progestin. Thank you!"

Qualitative Effectiveness Summary

One of the DRRC's primary missions is to work with individual prescribers to ensure the safest, highest-quality pharmacotherapy for Medicaid patients at the lowest cost possible. As the review process has matured, we have increased the level of interaction with individual prescribers regarding their patients' DRPs. As a result, we have more information on the impact of our reviews.

The following patient profiles are indicative of the types of patients being reviewed and the outcomes of those reviews:

Patient 1

A 37-year-old female had two prescriptions filled for gabapentin from two different providers. Prescriptions were filled for gabapentin 600 mg (#90 monthly) and gabapentin 300 mg (#120 monthly). Diagnosis coding included past medication poisoning, psychoactive substance abuse, opioid dependence, chronic pain, and anxiety disorder.

Gabapentin has become a drug of abuse producing euphoria, improved sociability, a marijuana-like high, relaxation, and a sense of calm. In the setting of a history of medication abuse and poisoning, we asked the prescribers to coordinate care and perhaps limit prescriptive authority to a single prescriber. Additionally, we asked the providers to consider whether the patient might benefit from treatment of her anxiety disorder and recommended use of a selective-serotonin reuptake inhibitor (SSRI) or serotonin-norepinephrine reuptake inhibitor (SNRI).

At follow-up, the patient continues to receive both gabapentin prescriptions, now authorized by a single provider, and a new prescription for venlafaxine ER (an SNRI) had been filled.

Patient 2

A 51-year-old female regularly had filled prescriptions for both oxycodone/acetaminophen (ACTM) 7.5-325 mg and clonazepam 1 mg over the previous 6 months. Diagnosis coding included chronic pain, interstitial cystitis and generalized anxiety disorder.

The FDA had recently implemented labeling changes for benzodiazepines and opioids, stating that concomitant use might result in profound sedation, respiratory depression, coma, and death, and that the combination should be used only in patients with inadequate alternative treatment options.

We presented the FDA black box and epidemiologic support information to the prescriber for consideration of the appropriateness of the combination of opioid and benzodiazepine. We recommended the addition of an

SSRI or SNRI for treatment of generalized anxiety disorder with a slow taper of the benzodiazepine, as guidelines recommend benzodiazepine use for only short durations of therapy (most commonly during acute crisis).

At follow-up, oxycodone/ACTM had been discontinued, and the patient continues on clonazepam therapy with the addition of fluoxetine (an SSRI agent).

Patient 3

A 62-year-old male with pertinent diagnosis coding of chronic pain, chronic obstructive pulmonary disorder (COPD), dorsalgia, opioid dependence, obstructive sleep apnea, hypoxia, and systolic heart failure regularly filled prescriptions for oxycodone 30 mg (#60 monthly) and morphine ER 100 mg (#60 monthly). This opioid regimen provides approximately 290 mg morphine equivalent units (MEUs) daily.

We made 5 recommendations based on the 2016 CDC publication, "Guideline for Prescribing Opioids for Chronic Pain:"[10] 1) consider provision of a prescription of naloxone (opioid reversal agent) due to the high opioid dosage; 2) consider whether hyperalgesia may contribute to the patient's high opioid requirement; 3) consider a pain specialist consultation (the CDC recommends such at doses greater than 90 mg MEUs daily); 4) confirm the patient's respiratory status is stable in the setting of COPD and obstructive sleep apnea due to the increased risk of toxicity; and 5) consider the addition of a bowel regimen.

At follow-up, the dosage of morphine ER had been reduced to 100 mg (#30 monthly) with continuation of the same oxycodone regimen. Prescriptions for naloxone or a bowel regimen were not noted. We are unable to determine whether a consult with a pain specialist was performed.

Quantitative Effectiveness Summary

Change in Numbers of Prescriptions Filled

Figure 21 shows the average number of prescription fills per patient, by selection method, for all reviews done between October 2016 and September 2017 compared to the average number of prescriptions filled per patient at the end of the current reporting period in September 2017. The largest reduction in the average number of monthly prescription fills was seen in patients selected on the basis of RxRisk score (18.4%). Figure 22 shows

Figure 21. Average number of prescription fills per patient, by selection method, for all reviews done between October 2016 and September 2017 compared to the average number of prescriptions filled per patient at the end of the current reporting period in September 2017.

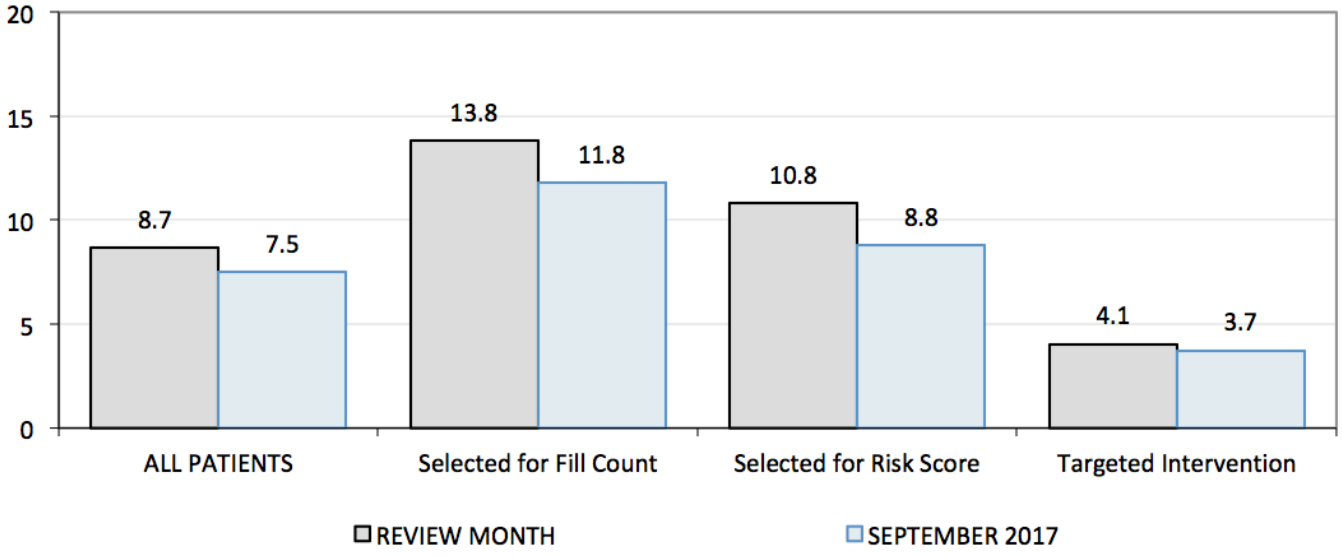
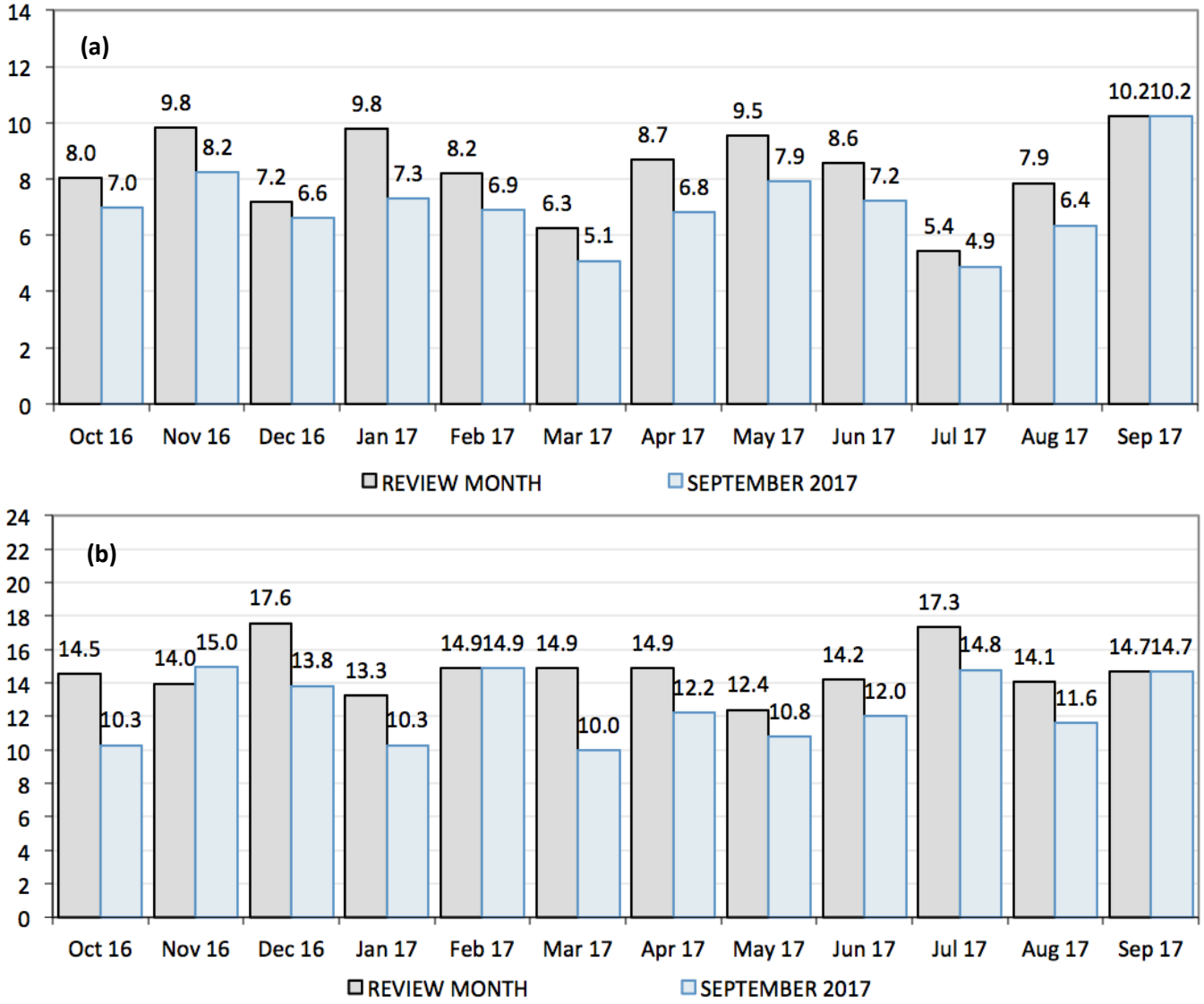


Figure 22. Average number of prescription fills per patient each month, compared to the average number of prescriptions filled per patient by those same patients at the end of the current reporting period in September 2017 for (a) all reviewed patients and (b) patients selected on the basis of prescription refills.



how the patients of each month change the number of their prescription fills, comparing their review month to the end of the reporting period (September 2017). Figure 22a shows this for all reviewed patients, and Figure 22b shows this for patients selected on the basis of prescription refills. There were much more consistent reductions for all reviewed patients than for prescription refill patients.

Change in RxRisk Scores

Figure 23 shows the average risk score per patient, by selection method, for all reviews done between October 2016 and September 2017 compared to the average risk score per patient at the end of the current reporting period in September 2017. The biggest reduction in risk scores was seen in patients selected on the basis of risk score (6.7%).

Figure 24 shows how the patients of each month change their RxRisk score, comparing their review month to the end of the reporting period (September 2017). Figure 24a shows this for all reviewed patients, and Figure 24b shows this for patients selected on the basis of RxRisk score. With the exception of June 2017, the patients selected based on RxRisk score generally had greater changes in risk score than all reviewed patients.

Figure 23. Average RxRisk score per patient, by selection method, for all reviews done October 2016-September 2017 compared to the average RxRisk score per patient at the end of the current reporting period in September 2017.

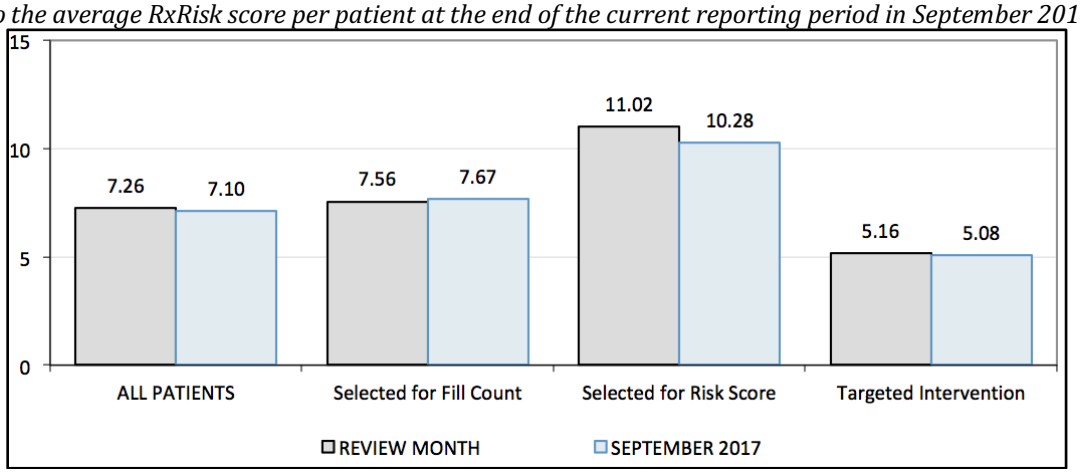
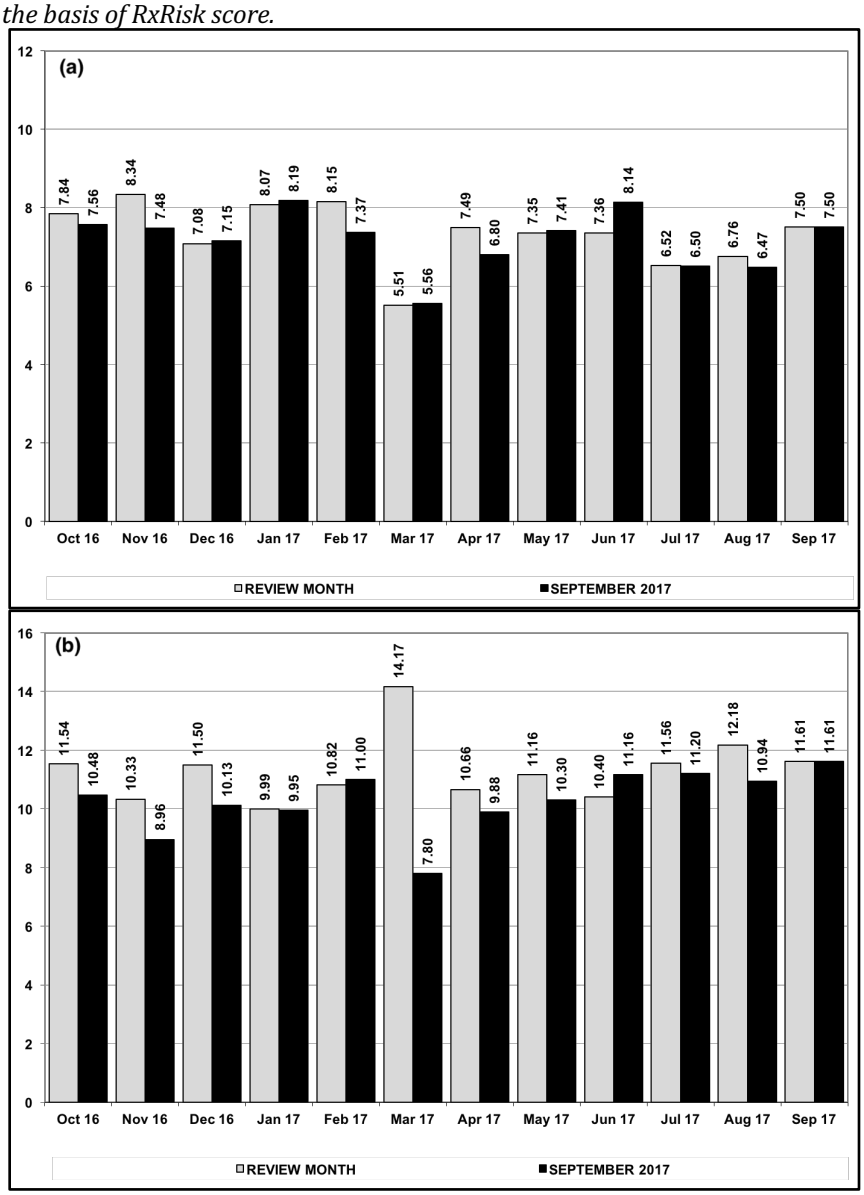


Figure 24. Average RxRisk score per patient each month, compared to the average RxRisk score per patient by those same patients at the end of the current reporting period in September 2017 for (a) all reviewed patients and (b) patients selected on the basis of RxRisk score.



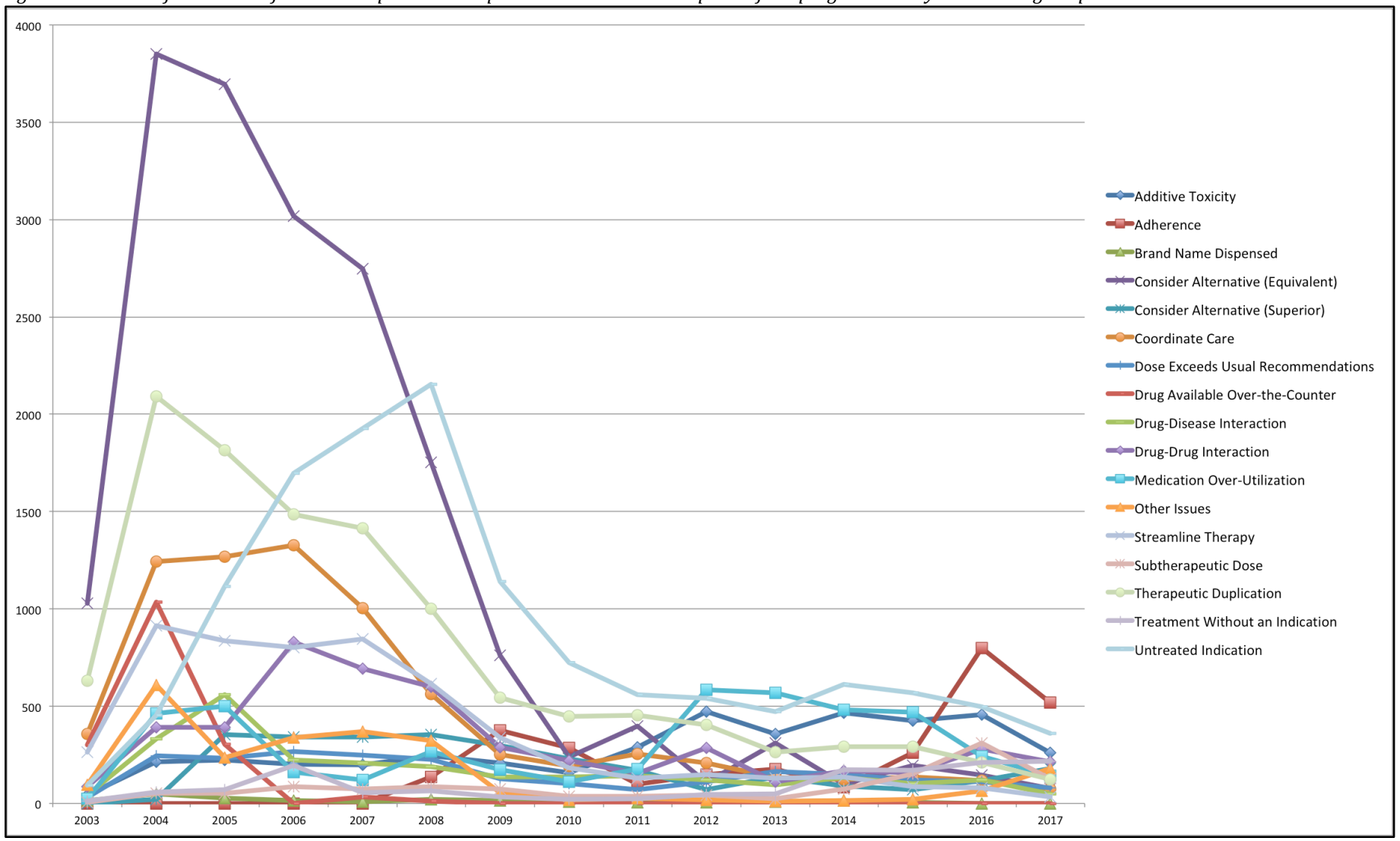
Change in DTPs

Table 6 shows the numbers of patients reviewed for targeted interventions whose 6-month follow-up occurred in the current reporting period (October 2016-September 2017), as well as the numbers that were still Medicaid-eligible during that 6-month follow-up period and the numbers who continued to meet the criteria for the targeted intervention at the 6-month follow-up. On average, the proportions of patients who still had the identified DTP in the follow up month diminished by a monthly average of 57.3% (range 33.3% to 98.6%). These reductions were explained by a combination of (A) a reduction in the number of patients still Medicaid-eligible (34.8%) as well as a reduction in the number of patients who had the DTP among those who continued to have benefits (29.0%). Figure 25 summarizes the trends of DTPs identified in the reports sent to prescribers since the inception of the program in May 2002 through September 2017. Early in the program, the key DTPs identified were to consider an alternative but equivalent therapy and therapeutic duplication, with a peak in untreated indications in 2008. In latter years, the primary DRP identified has been adherence, but at a much lower frequency than in earlier years.

Table 6. Targeted intervention rule six-month follow-up results, October 2016-September 2017

Original review		Follow-up review					
			Medicaid eligible		Original DTP still present		
Month	Number with DRP	Month	Number	% reduction	Number	% reduction out of Medicaid-eligible patients	% reduction overall
16-Apr	88	16-Oct	65	26.1	42	35.4	52.3
16-May	27	16-Nov	25	7.4	18	28.0	33.3
16-Jun	60	16-Dec	47	21.7	23	51.1	61.7
16-Jul	49	17-Jan	37	24.5	19	48.6	61.2
16-Aug	85	17-Feb	62	27.1	50	19.4	41.2
16-Sep	27	17-Mar	22	18.5	15	31.8	44.4
16-Oct	63	17-Apr	55	12.7	39	29.1	38.1
16-Nov	33	17-May	20	39.4	13	35.0	60.6
16-Dec	88	17-Jun	72	18.2	48	33.3	45.5
17-Jan	19	17-Jul	14	26.3	9	35.7	52.6
17-Feb	41	17-Aug	1	97.6	1	0.0	97.6
17-Mar	72	17-Sep	1	98.6	1	0.0	98.6
Average	54.3	–	35.1	34.8	23.2	29.0	57.3

Figure 25. Trends of DRPs identified in the reports sent to prescribers since the inception of the program in May 2002 through September 2017



Change in Cost

The DRRC does not review costs as one of its primary services to Utah Medicaid. However, cost is affected indirectly by the services provided by the DRRC, so it is evaluated as a measure of program success in a later section of this report.

Drug Cost Savings of Reviewed Medicaid Patients

Drug cost expenditures among reviewed patients, stratified by selection method, are available in Appendix A. Overall savings for reviewed patients was $1,184,254, summarized in Table 7. In a comparison of expenditures in each review month with those at the end of the current reporting period, most total and average expenditures trended downward. However, in 3 monthly cohorts (patients from October 2016, March 2017, and April 2017), the average expenditure ultimately increased. Generally, changes in expenditures over time have great variability, particularly when analyzed via selection method.

Table 7. Summary of drug cost savings in reviewed patients

Selected by fill count	$737,649
Selected by RxRisk score	$482,785
Selected by variable rule	$145,765
TOTAL	**$1,184,254**

Patients selected for fill count experienced a total expenditure savings of 18.3% by the end of the current reporting period compared to baseline month of review. In only 3 of the monthly cohorts (January, February, and April 2017) did the total expenditures occasionally exceed the baseline. Average expenditures exceeded baseline more frequently, but especially for January 2017 patients. Recommendations for these patients were more likely to be for cost-related problems such as therapeutic duplication and availability of cheaper alternatives.

Patients selected for RxRisk score experienced a total expenditure savings of 16.6% by the end of the current reporting period compared to baseline month of review, with March 2017 patients being the basis of as much as 62.9% total savings and 52.2% average savings. In 5 of the monthly cohorts (December 2016 and February, April, May, and June 2017), total expenditures occasionally exceeded baseline. Average expenditures exceeded baseline more frequently, but especially for December 2016 and April and May 2017 patients. Patients selected for RxRisk score tended to have DTPs that are more clinical in nature (e.g., potential drug interactions and untreated indications). The primary benefit of this type of intervention tends to be longer-term savings and increased quality of care.

Patients selected with variable rule experienced a total expenditure savings of 13.9% by the end of the current reporting period compared to baseline month of review, with November 2016 patients being the basis of as much as 62.4% total savings (42.8% average savings), but with March 2017 patients having increased expenditures by as much as 37.0% total (61.6% average). March 2017 patients also had increased expenditures by more than 200%, total and average, during the months of May, June, and July 2017 compared to baseline. Because the variable rule changes from month to month, trends from month to month are less meaningful. As with patients selected for RxRisk score, the primary benefits of this type of intervention also tend to be longer-term savings and increased quality of care.

Change in Costs for Common Drug Products

Table 8 shows the change in expenditures over the current reporting period for the 10 drug products most commonly prescribed to DRRC-reviewed patients. Over the course of the current reporting period, there were five (5) double-digit increases, three (3) single-digit increases, one (1) double-digit decrease and one (1) single-digit decrease in the average reimbursement amount. It is possible that preferred drug lists and underlying market factors affect the total savings seen over the course of the reporting period, though further analysis would be needed to confirm this. Manufacturer rebates are not considered in this analysis.

Limitations

There are limitations to what these cost data can yield. Because we eliminated patients who did not receive subsequent prescriptions, these cost estimates are conservative. We cannot determine what the reviewed patients' drug costs would have been if they had not been reviewed. To effectively address this we would need

to compare changes in prescription drug costs over the same period with a suitable control group. This is not possible with our current patient selection process.

Table 8. Average change in cost reimbursement over the current reporting period for the 10 drug products most commonly prescribed to DRRC-reviewed patients.

Generic	Product	Average expenditures 10/2016	Average expenditures 09/2017	% change
Omeprazole	OMEPRAZOLE CAP 20MG	$8.17	$9.95	17.9%
Gabapentin	GADAPENTIN CAP 200MG	$16.73	$17.20	2.79%
Omeprazole	OMEPRAZOLE CAP 40MG	$10.12	$10.89	7.1%
Insulin glargine	LANTUS INJ 100/ML	$376.18	$369.09	-1.9%
Albuterol sulfate	VENTOLIN HFA AER	$53.04	$54.27	2.3%
Tramadol	TRAMADOL HCL TAB 50MG	$11.63	$16.19	28.2%
Clonazepam	CLONAZEPAM TAB 1MG	$6.42	$10.97	41.5%
Atorvastatin calcium	ATORVASTATIN TAB 40MG	$14.70	$11.19	-31.4%
Trazodone	TRAZODONE TAB 50MG	$4.74	$10.87	56.4%
Sodium chloride	SOD CHLORIDE INJ 0.9%	$34.56	$47.90	27.9%

Section 1 Summary

Patients selected for review are served by the missions of the DRRC in material ways: they frequently have adjustments made to their drug regimens that either result in improved care, lower expenditures, or both. Additionally, physicians receiving the recommendations of the DRRC are served with a comprehensive portrait of patients' regimens and are offered options for improved care and lowered cost.

SECTION 2: DUR BOARD REVIEWS

Drug Utilization Review (DUR) Board presentations focus on the role of selected agents among other treatments, and on the utilization of these agents in the Utah Medicaid population to ensure appropriate and medically necessary use while considering potential safety, abuse and misuse issues.

Methods

How Topics are Selected

DRRC members and Medicaid pharmacy team members meet quarterly to collaboratively plan and update future DUR topics. The proposed topics are presented to the Utah Medicaid Bureau Director for approval. Indications for DUR review include safety considerations, appropriate use, quantity limitations, and other areas of concern.

Assembling the Hierarchy of Evidence (HOE)

We perform a literature review according to a hierarchy of evidence (HOE) strategy. Depending on the type of evidence needed and available, common search locales include Medline (PubMed); the US Food and Drug Administration (FDA) website (including product labeling information); Lexicomp; World Health Organization; national associations governing research and treatment of the disease state; and other drug databases. Reference lists from search results are screened for additional relevant publications.

For each report a utilization strategy is developed in order to identify usage patterns of the medication(s) being reviewed. Utah Medicaid utilization data are extracted using Utah Medicaid classification (0812*) and are included in the reports. Other data centers such as the Centers for Disease Control and prevention (CDC), Agency for Healthcare Research and Quality (AHRQ), Public Health Indicator Based Information System (IBIS) Utah's Public Health Data Resource,[11] the FDA website, Micromedex, Lexicomp, UpToDate, Pharmacist's letter, Cochrane Library and PubMed may also be searched for specific information to help inform the drug utilization extraction.

Disseminating the Reviews

Approximately 1-2 weeks before the DUR meeting date, reviews are submitted to the Board and published to the publicly accessible Medicaid website (https://medicaid.utah.gov/pharmacy/drug-utilization-review-board). Decisions of the DUR board are published in the agenda and minutes of the subsequent meeting in the following month.

Results

During the reporting period of October 2016-September 2017, 9 topics were addressed over a total of 10 presentations. From the beginning of the current contract through September 2017, 30 topics were addressed over a total of 34 presentations. Table 9 summarizes the research done for DUR Board presentations between October 2016 and September 2017.

Limitations

The greatest limitations to reports of this kind are the constraints on scope and time. Because such reports are produced monthly, not all topics receive exhaustive review. Scope is limited by necessity but also needs to cover enough of the topic requested by the DUR board to actionably inform their decisions regarding Utah Medicaid.

Table 9. Drug Utilization Review (DUR) Board presentations produced by the DRRC, October 2016-September 2017

Date of Presentation	Topic of Presentation
10/13/16	Long-acting opioids (part 2 of 3)[a]
11/10/16	Long-acting opioids (part 3 of 3)[a]
11/10/16	Akynzeo
12/08/17	Buprenorphine
01/12/17	No review

Table 9. Drug Utilization Review (DUR) Board presentations produced by the DRRC, October 2016-September 2017

Date of Presentation	Topic of Presentation
02/09/17	Long-acting blood factors
03/09/17	No review
04/13/17	Meeting canceled
05/11/17	Vivitrol
06/08/17	Long-acting insulins
07/13/17	Benzodiazepines
08/10/17	Benzodiazepine interface with Attention Deficit Hyperactivity Disorder (ADHD)/Attention Deficit Disorder (ADD) stimulants
09/14/17	Pediatric codeine and tramadol

[a] *Part 1 presented in September 2016.*

SECTION 3: P&T COMMITTEE REVIEWS

Pharmacy and Therapeutics (P&T) Committee reports consist of a class review, utilization data and list of available agents and dosage forms.

Methods

How Topics are Selected

DRRC members and Medicaid pharmacy team members meet quarterly to collaboratively plan and update future P&T topics. The proposed topics are presented to the Utah Medicaid Bureau Director for approval. Indications for P&T review include new drugs, new drug classes, and re-review of previously presented topics in order to assess the safety and efficacy of the medications.

Assembling the Reviews

For each approved topic, a research librarian develops a search strategy and performs a systematic literature review to be used by the DRRC and Utah Medicaid to define the scope of the report. Two methodological filters are used, one for systematic reviews/meta-analyses (SR/MAs) and another for randomized controlled trials (RCTs). Results are limited to English language. Databases are searched from 2010 to present for SR/MAs and from 2015 to present for RCTs. We also screen the reference lists of related systematic reviews and other relevant websites for further information. At least two review authors screen titles and abstracts. Conflicts are resolved via discussion between reviewers or a third person. The full texts for all citations receiving two inclusion votes are retrieved and reviewed. Evidence is selected according to the HOE by the lead author. High quality SR/MAs may be sufficient to answer the questions of comparable safety and efficacy, but when necessary, evidence to the level of direct RCT comparisons are included. In these cases, SR/MAs of RCTs and RCTs providing direct head-to-head efficacy and/or safety comparisons are prioritized.

Disseminating the Reviews

Reviews are submitted to the P&T committee approximately 2 weeks before meeting dates and published to the Medicaid website (https://medicaid.utah.gov/pharmacy/pt-committee) for the public.

Committee Decisions

Decisions of the P&T committee are published in the agenda and minutes of the subsequent meeting in the following month. Medications shown to be equally safe and effective are then considered for inclusion on the Utah Medicaid Preferred Drug List.

Results

During the reporting period of October 2016-September 2017, 9 topics were addressed over a total of 8 presentations. From the beginning of the current contract through September 2017, 12 topics were addressed over a total of 11 presentations. Table 10 summarizes the research done for P&T Committee reports between October 2016 and September 2017.

Limitations

The greatest limitations to reports of this kind are the constraints on scope and time. Because such reports are produced monthly, not all topics receive exhaustive review. Scope is limited by necessity but also needs to cover enough of the topic requested by the P&T committee to actionably inform their decisions regarding the Preferred Drug Lists.

Table 10. Pharmacy and Therapeutics (P&T) Committee presentations produced by the DRRC, October 2016-September 2017

Date of Presentation	Topic of Presentation
10/20/16	No meeting
11/17/16	Older anticonvulsant agents
11/17/16	Anxiolytics

Table 10. Pharmacy and Therapeutics (P&T) Committee presentations produced by the DRRC, October 2016-September 2017

Date of Presentation	Topic of Presentation
12/15/16	No meeting
01/19/17	Opioid combinations
02/16/17	No meeting
03/16/17	HIV entry inhibitors; integrase strand transfer inhibitors (INSTIs); and non-nucleoside reverse transcriptase inhibitors (NNRTIs)
04/20/17	HIV nucleotide/nucleoside reverse transcriptase inhibitors (NRTIs) and combination products
05/18/17	Anti-gout agents
06/15/17	Parathyroid hormone analogs
07/20/17	No meeting
08/17/17	Long-acting anticholinergic/Beta 2 agonist combo inhalers for chronic obstructive pulmonary disease (COPD)
09/21/17	Opioid dependence treatments

CONCLUSIONS

As in most years, this year the DRRC helped to mitigate increasing drug costs that have trended upward since 2006, as well as to improve care both to specific patients and to cohorts of patients identified by disease state. Drug costs among all patients decreased very slightly during the current reporting period, from $17,845,986 to $17,834,153 per month (<0.1% change).

The DRRC also continued to fulfill the need for review of key quality and safety indicators in the prescribing of the Utah Medicaid health system. Pharmacist reviews of therapy for Medicaid patients have improved the quality of their drug regimens, as well as clinical and economic endpoints. Congruent with the review of patients at the microscopic level, the DRRC has also produced numerous macroscopic recommendations for the Medicaid Preferred Drug List (PDL) and current criteria review documents for the DUR and P&T.

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APPENDIX A

Appendix A1. Total and average reimbursement for all reviewed patients fitting inclusion criteria

Review month (RM)	# patients	16-Oct		16-Nov		16-Dec		17-Jan		17-Feb		17-Mar		17-Apr		17-May		17-Jun		17-Jul		17-Aug		17-Sep		Actual total	Projected total	Savings	
		$	% of RM	$	% of RM	$	% of RM	$	% of RM	$	% of RM	$	% of RM	$	% of RM	$	% of RM	$	% of RM	$	% of RM	$	% of RM	$	% of RM			$	%
Total reimbursement																													
16-Oct	105	$95,110	n/a	$80,168	84.3%	$81,491	85.7%	$78,643	82.7%	$81,049	85.2%	$81,270	85.4%	$69,369	72.9%	$76,549	80.5%	$70,213	73.8%	$70,860	74.5%	$72,032	75.7%	$59,639	62.7%	$916,393	$1,141,319	$224,926	19.7%
16-Nov	110	.		$126,192	n/a	$86,206	68.3%	$89,656	71.0%	$85,285	67.6%	$84,950	67.3%	$80,744	64.0%	$87,711	69.5%	$82,009	65.0%	$87,955	69.7%	$80,919	64.1%	$76,921	61.0%	$968,548	$1,388,112	$419,564	30.2%
16-Dec	108	.		.		$37,303	n/a	$36,641	98.2%	$33,777	90.5%	$37,691	101.0%	$31,754	85.1%	$36,537	97.9%	$23,982	64.3%	$24,150	64.7%	$27,659	74.1%	$17,742	47.6%	$307,236	$373,026	$65,790	17.6%
17-Jan	72	.		.		.		$155,596	n/a	$129,092	83.0%	$122,086	78.5%	$120,045	77.2%	$128,624	82.7%	$134,361	86.4%	$144,865	93.1%	$137,054	88.1%	$106,298	68.3%	$1,178,021	$1,400,364	$222,343	15.9%
17-Feb	79	.		.		.		.		$19,330	n/a	$22,472	116.3%	$14,986	77.5%	$16,593	85.8%	$15,481	80.1%	$17,738	91.8%	$11,273	58.3%	$9,601	49.7%	$127,475	$154,642	$27,167	17.6%
17-Mar	86	.		.		.		.		.		$52,738	n/a	$38,862	73.7%	$66,875	126.8%	$64,940	123.1%	$64,237	121.8%	$35,425	67.2%	$32,869	62.3%	$355,946	$369,164	$13,218	3.6%
17-Apr	70	.		.		.		.		.		.		$79,147	n/a	$100,774	127.3%	$69,790	88.2%	$57,228	72.3%	$64,980	82.1%	$55,455	70.1%	$427,375	$474,884	$47,509	10.0%
17-May	72	.		.		.		.		.		.		.		$112,594	n/a	$90,232	80.1%	$89,139	79.2%	$100,288	89.1%	$81,543	72.4%	$473,796	$562,970	$89,174	15.8%
17-Jun	82	.		.		.		.		.		.		.		.		$51,402	n/a	$35,706	69.5%	$41,783	81.3%	$35,350	68.8%	$164,242	$205,609	$41,368	20.1%
17-Jul	63	.		.		.		.		.		.		.		.		.		$126,256	n/a	$114,535	90.7%	$110,296	87.4%	$351,087	$378,768	$27,681	7.3%
17-Aug	74	.		.		.		.		.		.		.		.		.		.		$55,990	n/a	$50,477	90.2%	$106,467	$111,981	$5,514	4.9%
17-Sep	89	.		.		.		.		.		.		.		.		.		.		.		$141,390	n/a	n/a	n/a	n/a	n/a
TOTAL																										$5,376,584	$6,560,838	$1,184,254	18.1%
Average reimbursement per patient																													
16-Oct	105	$780	n/a	$826	105.9%	$807	103.5%	$837	107.3%	$853	109.4%	$874	112.1%	$816	104.6%	$911	116.8%	$807	103.5%	$908	116.4%	$912	116.9%	$785	100.6%	$10,116	$9,355	($761)	-8.1%
16-Nov	110	.		$942	n/a	$718	76.2%	$766	81.3%	$742	78.8%	$745	79.1%	$702	74.5%	$820	87.0%	$812	86.2%	$838	89.0%	$826	87.7%	$785	83.3%	$8,695	$10,359	$1,664	16.1%
16-Dec	108	.		.		$565	n/a	$611	108.1%	$554	98.1%	$685	121.2%	$611	108.1%	$677	119.8%	$444	78.6%	$464	82.1%	$553	97.9%	$403	71.3%	$5,567	$5,652	$85	1.5%
17-Jan	72	.		.		.		$949	n/a	$849	89.5%	$809	85.2%	$828	87.2%	$899	94.7%	$967	101.9%	$1,081	113.9%	$1,054	111.1%	$844	88.9%	$8,280	$8,539	$259	3.0%
17-Feb	79	.		.		.		.		$716	n/a	$832	116.2%	$624	87.2%	$721	100.7%	$704	98.3%	$887	123.9%	$593	82.8%	$565	78.9%	$5,643	$5,727	$85	1.5%
17-Mar	86	.		.		.		.		.		$467	n/a	$381	81.6%	$697	149.3%	$684	146.5%	$706	151.2%	$403	86.3%	$361	77.3%	$3,698	$3,267	($431)	-13.2%
17-Apr	70	.		.		.		.		.		.		$842	n/a	$1,186	140.9%	$831	98.7%	$724	86.0%	$833	98.9%	$739	87.8%	$5,155	$5,052	($103)	-2.0%
17-May	72	.		.		.		.		.		.		.		$1,043	n/a	$911	87.3%	$938	89.9%	$1,056	101.2%	$906	86.9%	$4,854	$5,213	$359	6.9%
17-Jun	82	.		.		.		.		.		.		.		.		$857	n/a	$649	75.7%	$774	90.3%	$667	77.8%	$2,947	$3,427	$480	14.0%
17-Jul	63	.		.		.		.		.		.		.		.		.		$658	n/a	$647	98.3%	$641	97.4%	$1,946	$1,973	$27	1.4%
17-Aug	74	.		.		.		.		.		.		.		.		.		.		$700	n/a	$656	93.7%	$1,355	$1,400	$44	3.2%
17-Sep	89	.		.		.		.		.		.		.		.		.		.		.		$1,198	n/a	n/a	n/a	n/a	n/a

Appendix A2. Total and average reimbursement for patients selected by fill count and fitting inclusion criteria

Review month (RM)	# patients	16-Oct		16-Nov		16-Dec		17-Jan		17-Feb		17-Mar		17-Apr		17-May		17-Jun		17-Jul		17-Aug		17-Sep		Actual total	Projected total	Savings	
		$	% of RM	$	% of RM	$	% of RM	$	% of RM	$	% of RM	$	% of RM	$	% of RM	$	% of RM	$	% of RM	$	% of RM	$	% of RM	$	% of RM			$	%
Total reimbursement																													
16-Oct	105	$66,672	n/a	$57,863	86.8%	$59,750	89.6%	$58,445	87.7%	$49,186	73.8%	$58,419	87.6%	$48,152	72.2%	$56,772	85.2%	$51,410	77.1%	$53,308	80.0%	$50,958	76.4%	$46,972	70.5%	$657,908	$800,059	$142,152	17.8%
16-Nov	110	.		$74,385	n/a	$51,882	69.7%	$51,874	69.7%	$48,413	65.1%	$48,048	64.6%	$45,583	61.3%	$51,804	69.6%	$47,456	63.8%	$51,166	68.8%	$49,978	67.2%	$52,564	70.7%	$573,152	$818,232	$245,080	30.0%
16-Dec	108	.		.		$22,223	n/a	$21,491	96.7%	$20,559	92.5%	$20,428	91.9%	$17,946	80.8%	$18,159	81.7%	$11,317	50.9%	$11,192	50.4%	$13,323	60.0%	$9,761	43.9%	$166,399	$222,232	$55,833	25.1%
17-Jan	72	.		.		.		$103,317	n/a	$93,996	91.0%	$91,868	88.9%	$75,728	73.3%	$96,228	93.1%	$101,918	98.6%	$114,918	111.2%	$108,714	105.2%	$87,527	84.7%	$874,214	$929,853	$55,639	6.0%
17-Feb	79	.		.		.		.		$11,532	n/a	$13,138	113.9%	$7,865	68.2%	$10,339	89.7%	$8,555	74.2%	$12,862	111.5%	$7,499	65.0%	$6,078	52.7%	$77,868	$92,255	$14,387	15.6%
17-Mar	86	.		.		.		.		.		$23,423	n/a	$17,567	75.0%	$18,028	77.0%	$17,694	75.5%	$16,187	69.1%	$18,056	77.1%	$16,127	68.9%	$127,081	$163,960	$36,879	22.5%
17-Apr	70	.		.		.		.		.		.		$53,821	n/a	$74,028	137.5%	$40,416	75.1%	$35,009	65.0%	$31,964	59.4%	$31,170	57.9%	$266,409	$322,927	$56,518	17.5%
17-May	72	.		.		.		.		.		.		.		$76,806	n/a	$58,034	75.6%	$54,912	71.5%	$68,807	89.6%	$53,826	70.1%	$312,386	$384,030	$71,645	18.7%
17-Jun	82	.		.		.		.		.		.		.		.		$25,422	n/a	$14,879	58.5%	$11,085	43.6%	$9,766	38.4%	$61,153	$101,690	$40,537	39.9%
17-Jul	63	.		.		.		.		.		.		.		.		.		$39,525	n/a	$34,183	86.5%	$29,254	74.0%	$102,962	$118,575	$15,613	13.2%
17-Aug	74	.		.		.		.		.		.		.		.		.		.		$41,531	n/a	$38,164	91.9%	$79,695	$83,061	$3,367	4.1%
17-Sep	89	.		.		.		.		.		.		.		.		.		.		.		$97,051	n/a	n/a	n/a	n/a	n/a
TOTAL																										$3,299,225	$4,036,874	$737,649	18.3%
Average reimbursement per patient																													
16-Oct	105	$1,482	n/a	$1,315	88.7%	$1,390	93.8%	$1,425	96.2%	$1,200	81.0%	$1,498	101.1%	$1,267	85.5%	$1,494	100.8%	$1,318	88.9%	$1,441	97.2%	$1,416	95.5%	$1,236	83.4%	$16,481	$17,779	$1,298	7.3%
16-Nov	110	.		$1,617	n/a	$1,179	72.9%	$1,235	76.4%	$1,181	73.0%	$1,172	72.5%	$1,140	70.5%	$1,400	86.6%	$1,318	81.5%	$1,421	87.9%	$1,428	88.3%	$1,546	95.6%	$14,637	$17,788	$3,151	17.7%
16-Dec	108	.		.		$1,482	n/a	$1,433	96.7%	$1,371	92.5%	$1,362	91.9%	$1,196	80.7%	$1,211	81.7%	$754	50.9%	$799	53.9%	$1,025	69.2%	$751	50.7%	$11,383	$14,815	$3,432	23.2%
17-Jan	72	.		.		.		$1,245	n/a	$1,160	93.2%	$1,178	94.6%	$996	80.0%	$1,283	103.1%	$1,359	109.2%	$1,619	130.0%	$1,510	121.3%	$1,287	103.4%	$11,637	$11,203	($434)	-3.9%
17-Feb	79	.		.		.		.		$961	n/a	$1,095	113.9%	$715	74.4%	$1,149	119.6%	$951	99.0%	$1,429	148.7%	$833	86.7%	$675	70.2%	$7,808	$7,688	($120)	-1.6%
17-Mar	86	.		.		.		.		.		$937	n/a	$764	81.5%	$819	87.4%	$804	85.8%	$771	82.3%	$785	83.8%	$701	74.8%	$5,581	$6,558	$977	14.9%
17-Apr	70	.		.		.		.		.		.		$1,145	n/a	$1,682	146.9%	$986	86.1%	$875	76.4%	$820	71.6%	$842	73.5%	$6,351	$6,871	$520	7.6%
17-May	72	.		.		.		.		.		.		.		$1,182	n/a	$951	80.5%	$947	80.1%	$1,186	100.3%	$997	84.3%	$5,263	$5,908	$645	10.9%
17-Jun	82	.		.		.		.		.		.		.		.		$1,495	n/a	$930	62.2%	$652	43.6%	$651	43.5%	$3,729	$5,982	$2,253	37.7%
17-Jul	63	.		.		.		.		.		.		.		.		.		$1,464	n/a	$1,315	89.8%	$1,170	79.9%	$3,949	$4,392	$443	10.1%
17-Aug	74	.		.		.		.		.		.		.		.		.		.		$1,065	n/a	$1,004	94.3%	$2,069	$2,130	$61	2.9%
17-Sep	89	.		.		.		.		.		.		.		.		.		.		.		$1,407	n/a	n/a	n/a	n/a	n/a

Appendix A3. Total and average reimbursement for patients selected by RxRisk score and fitting inclusion criteria

Review month (RM)	# patients	16-Oct		16-Nov		16-Dec		17-Jan		17-Feb		17-Mar		17-Apr		17-May		17-Jun		17-Jul		17-Aug		17-Sep		Actual total	Projected total	Savings	
		$	% of RM	$	% of RM	$	% of RM	$	% of RM	$	% of RM	$	% of RM	$	% of RM	$	% of RM	$	% of RM	$	% of RM	$	% of RM	$	% of RM			$	%
Total reimbursement																													
16-Oct	105	$41,997	n/a	$35,374	84.2%	$39,637	94.4%	$40,603	96.7%	$26,055	62.0%	$36,489	86.9%	$25,211	60.0%	$31,850	75.8%	$36,352	86.6%	$23,593	56.2%	$32,269	76.8%	$27,428	65.3%	$396,859	$503,963	$107,104	21.3%
16-Nov	110	.		$53,384	n/a	$47,077	88.2%	$48,466	90.8%	$45,477	85.2%	$46,653	87.4%	$47,542	89.1%	$47,136	88.3%	$45,104	84.5%	$44,436	83.2%	$38,585	72.3%	$36,834	69.0%	$500,692	$587,221	$86,529	14.7%
16-Dec	108	.		.		$14,560	n/a	$14,946	102.7%	$12,604	86.6%	$16,633	114.2%	$16,097	110.6%	$17,427	119.7%	$8,690	59.7%	$8,233	56.5%	$9,157	62.9%	$5,444	37.4%	$123,790	$145,597	$21,807	15.0%
17-Jan	72	.		.		.		$94,848	n/a	$83,370	87.9%	$79,451	83.8%	$77,902	82.1%	$81,809	86.3%	$68,752	72.5%	$63,603	67.1%	$64,587	68.1%	$42,714	45.0%	$657,036	$853,628	$196,592	23.0%
17-Feb	79	.		.		.		.		$9,056	n/a	$12,804	141.4%	$6,876	75.9%	$10,141	112.0%	$7,382	81.5%	$12,548	138.6%	$7,395	81.7%	$4,838	53.4%	$71,039	$72,449	$1,410	1.9%
17-Mar	86	.		.		.		.		.		$9,955	n/a	$4,820	48.4%	$2,866	28.8%	$2,334	23.4%	$1,244	12.5%	$1,991	20.0%	$2,632	26.4%	$25,842	$69,688	$43,846	62.9%
17-Apr	70	.		.		.		.		.		.		$41,453	n/a	$41,385	99.8%	$44,128	106.5%	$34,509	83.2%	$42,438	102.4%	$35,769	86.3%	$239,683	$248,717	$9,035	3.6%
17-May	72	.		.		.		.		.		.		.		$32,759	n/a	$32,670	99.7%	$32,918	100.5%	$37,984	115.9%	$31,116	95.0%	$167,448	$163,797	($3,651)	-2.2%
17-Jun	82	.		.		.		.		.		.		.		.		$24,157	n/a	$17,134	70.9%	$26,282	108.8%	$21,708	89.9%	$89,281	$96,626	$7,346	7.6%
17-Jul	63	.		.		.		.		.		.		.		.		.		$45,755	n/a	$42,768	93.5%	$39,552	86.4%	$128,074	$137,266	$9,191	6.7%
17-Aug	74	.		.		.		.		.		.		.		.		.		.		$18,916	n/a	$15,339	81.1%	$34,255	$37,832	$3,577	9.5%
17-Sep	89	.		.		.		.		.		.		.		.		.		.		.		$59,539	n/a	n/a	n/a	n/a	n/a
TOTAL																										$2,433,998	$2,916,783	$482,785	16.6%
Average reimbursement per patient																													
16-Oct	105	$1,105	n/a	$956	86.5%	$1,101	99.6%	$1,160	105.0%	$766	69.3%	$1,106	100.1%	$813	73.6%	$1,027	92.9%	$1,212	109.7%	$907	82.1%	$1,041	94.2%	$946	85.6%	$12,141	$13,262	$1,121	8.5%
16-Nov	110	.		$741	n/a	$713	96.2%	$723	97.6%	$711	96.0%	$718	96.9%	$710	95.8%	$725	97.8%	$739	99.7%	$717	96.8%	$654	88.3%	$635	85.7%	$7,786	$8,156	$370	4.5%
16-Dec	108	.		.		$1,213	n/a	$1,359	112.0%	$1,146	94.5%	$1,663	137.1%	$1,610	132.7%	$1,743	143.7%	$869	71.6%	$915	75.4%	$1,017	83.8%	$680	56.1%	$12,215	$12,133	($82)	-0.7%
17-Jan	72	.		.		.		$978	n/a	$958	98.0%	$883	90.3%	$906	92.6%	$974	99.6%	$859	87.8%	$776	79.3%	$850	86.9%	$577	59.0%	$7,761	$8,800	$1,040	11.8%
17-Feb	79	.		.		.		.		$755	n/a	$1,067	141.3%	$688	91.1%	$922	122.1%	$738	97.7%	$1,255	166.2%	$739	97.9%	$605	80.1%	$6,768	$6,037	($731)	-12.1%
17-Mar	86	.		.		.		.		.		$664	n/a	$344	51.8%	$287	43.2%	$212	31.9%	$138	20.8%	$284	42.8%	$292	44.0%	$2,222	$4,646	$2,424	52.2%
17-Apr	70	.		.		.		.		.		.		$1,036	n/a	$1,119	108.0%	$1,161	112.1%	$1,046	101.0%	$1,213	117.1%	$1,052	101.5%	$6,626	$6,218	($408)	-6.6%
17-May	72	.		.		.		.		.		.		.		$819	n/a	$883	107.8%	$968	118.2%	$1,085	132.5%	$915	111.7%	$4,671	$4,095	($576)	-14.1%
17-Jun	82	.		.		.		.		.		.		.		.		$966	n/a	$714	73.9%	$1,095	113.4%	$905	93.7%	$3,680	$3,865	$185	4.8%
17-Jul	63	.		.		.		.		.		.		.		.		.		$1,307	n/a	$1,258	96.3%	$1,163	89.0%	$3,728	$3,922	$193	4.9%
17-Aug	74	.		.		.		.		.		.		.		.		.		.		$788	n/a	$667	84.6%	$1,455	$1,576	$121	7.7%
17-Sep	89	.		.		.		.		.		.		.		.		.		.		.		$1,488	n/a	n/a	n/a	n/a	n/a

Appendix A4. Total and average reimbursement for patients selected by variable rule and fitting inclusion criteria

Review month (RM)	# patients	16-Oct		16-Nov		16-Dec		17-Jan		17-Feb		17-Mar		17-Apr		17-May		17-Jun		17-Jul		17-Aug		17-Sep		Actual total	Projected total	Savings	
		$	% of RM	$	% of RM	$	% of RM	$	% of RM	$	% of RM	$	% of RM	$	% of RM	$	% of RM	$	% of RM	$	% of RM	$	% of RM	$	% of RM			$	%
Total reimbursement																													
16-Oct	105	$15,385	n/a	$7,992	51.9%	$6,411	41.7%	$6,645	43.2%	$19,112	124.2%	$10,286	66.9%	$10,996	71.5%	$9,289	60.4%	$10,867	70.6%	$10,250	66.6%	$12,131	78.8%	$3,283	21.3%	$122,648	$184,624	$61,976	33.6%
16-Nov	110	.		$12,933	n/a	$2,904	22.5%	$4,427	34.2%	$4,396	34.0%	$5,120	39.6%	$2,518	19.5%	$5,030	38.9%	$5,528	42.7%	$5,833	45.1%	$2,347	18.1%	$2,410	18.6%	$53,446	$142,265	$88,819	62.4%
16-Dec	108	.		.		$11,084	n/a	$11,988	108.2%	$11,426	103.1%	$12,849	115.9%	$10,146	91.5%	$13,256	119.6%	$9,099	82.1%	$9,858	88.9%	$10,289	92.8%	$7,184	64.8%	$107,178	$110,844	$3,666	3.3%
17-Jan	72	.		.		.		$5,890	n/a	$5,965	101.3%	$4,891	83.0%	$3,609	61.3%	$5,002	84.9%	$3,873	65.8%	$2,896	49.2%	$1,851	31.4%	$1,517	25.8%	$35,494	$53,006	$17,512	33.0%
17-Feb	79	.		.		.		.		$4,128	n/a	$4,164	100.9%	$3,786	91.7%	$3,089	74.8%	$3,828	92.7%	$2,234	54.1%	$902	21.9%	$2,008	48.6%	$24,139	$33,023	$8,885	26.9%
17-Mar	86	.		.		.		.		.		$21,915	n/a	$17,778	81.1%	$46,711	213.1%	$45,607	208.1%	$47,506	216.8%	$15,960	72.8%	$14,704	67.1%	$210,181	$153,408	($56,773)	-37.0%
17-Apr	70	.		.		.		.		.		.		$7,717	n/a	$5,825	75.5%	$6,097	79.0%	$5,835	75.6%	$7,642	99.0%	$5,942	77.0%	$39,058	$46,302	$7,244	15.6%
17-May	72	.		.		.		.		.		.		.		$17,337	n/a	$17,224	99.3%	$17,697	102.1%	$20,066	115.7%	$13,845	79.9%	$86,170	$86,686	$516	0.6%
17-Jun	82	.		.		.		.		.		.		.		.		$11,378	n/a	$9,719	85.4%	$8,870	78.0%	$7,889	69.3%	$37,856	$45,510	$7,654	16.8%
17-Jul	63	.		.		.		.		.		.		.		.		.		$61,799	n/a	$57,551	93.1%	$59,199	95.8%	$178,550	$185,398	$6,849	3.7%
17-Aug	74	.		.		.		.		.		.		.		.		.		.		$5,156	n/a	$5,739	111.3%	$10,895	$10,312	($583)	-5.7%
17-Sep	89	.		.		.		.		.		.		.		.		.		.		.		$7,338	n/a				n/a
TOTAL																										$905,614	$1,051,379	$145,765	13.9%
Average reimbursement per patient																													
16-Oct	105	$275	n/a	$242	88.0%	$164	59.6%	$195	70.9%	$531	193.1%	$286	104.0%	$355	129.1%	$310	112.7%	$329	119.6%	$353	128.4%	$449	163.3%	$137	49.8%	$3,627	$3,297	($330)	-10.0%
16-Nov	110	.		$462	n/a	$138	29.9%	$246	53.2%	$220	47.6%	$284	61.5%	$140	30.3%	$335	72.5%	$395	85.5%	$343	74.2%	$181	39.2%	$161	34.8%	$2,905	$5,081	$2,176	42.8%
16-Dec	108	.		.		$241	n/a	$292	121.2%	$272	112.9%	$347	144.0%	$298	123.7%	$368	152.7%	$253	105.0%	$282	117.0%	$303	125.7%	$248	102.9%	$2,904	$2,410	($494)	-20.5%
17-Jan	72	.		.		.		$310	n/a	$314	101.3%	$288	92.9%	$258	83.2%	$333	107.4%	$277	89.4%	$263	84.8%	$185	59.7%	$152	49.0%	$2,380	$2,790	$410	14.7%
17-Feb	79	.		.		.		.		$516	n/a	$520	100.8%	$473	91.7%	$386	74.8%	$479	92.8%	$372	72.1%	$180	34.9%	$402	77.9%	$3,329	$4,128	$799	19.4%
17-Mar	86	.		.		.		.		.		$281	n/a	$254	90.4%	$697	248.0%	$702	249.8%	$742	264.1%	$266	94.7%	$237	84.3%	$3,179	$1,967	($1,212)	-61.6%
17-Apr	70	.		.		.		.		.		.		$257	n/a	$224	87.2%	$226	87.9%	$224	87.2%	$318	123.7%	$248	96.5%	$1,498	$1,543	$46	2.9%
17-May	72	.		.		.		.		.		.		.		$867	n/a	$1,013	116.8%	$983	113.4%	$1,115	128.6%	$865	99.8%	$4,843	$4,334	($509)	-11.7%
17-Jun	82	.		.		.		.		.		.		.		.		$474	n/a	$463	97.7%	$467	98.5%	$394	83.1%	$1,798	$1,896	$98	5.2%
17-Jul	63	.		.		.		.		.		.		.		.		.		$420	n/a	$433	103.1%	$459	109.3%	$1,312	$1,261	($51)	-4.0%
17-Aug	74	.		.		.		.		.		.		.		.		.		.		$172	n/a	$205	119.2%	$377	$344	($33)	-9.6%
17-Sep	89	.		.		.		.		.		.		.		.		.		.		.		$262	n/a	n/a	n/a	n/a	n/a